A Guide to Plants Important for Quail in Oklahoma

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Introduction

Oklahoma has two native species of quail – the northern bobwhite (*Colinus virginianus*, hereafter bobwhite) and the scaled quail (*Callipepla squamata*), which is also commonly called blue quail. The bobwhite occurs statewide, while the scaled quail is restricted to far western Oklahoma and the panhandle. Both species of quail are popular gamebirds within Oklahoma and many landowners are interested in quail habitat management. Habitat is the food, water, cover and space that a species requires. Plants make up a large component of what is considered habitat for a species. Plants provide food (both directly and indirectly), cover and water. Therefore, to manage quail, an understanding of plants that are used by quail is necessary.

The diet of Oklahoma's quail species is diverse and variable, depending on time of year and food availability. In addition, weather, predators and habitat quality can all affect where quail spend time and what quail consume at any given time. The seeds of some plants may be rarely eaten by quail even when abundant, but the succulent green foliage of these same plants may provide an important food source during the late winter and early spring period. In some cases, neither the foliage or seeds are important food sources, but the plants may attract a large variety and number of insects, which can be critical for summer brood production. Insects are extremely important quail foods to both quail chicks and adults, but their availability, and therefore consumption, during the fall and winter is limited compared to the spring and summer months.

Cover from predation and weather is as important as food. On many properties, it is lack of cover rather than lack of food that limits quail. Many plants provide shelter for quail, and without them, food would be irrelevant. Specific species of plants vary in when they are used as cover. Some plants are seasonally important (e.g. during nesting or roosting), while others provide cover during specific environmental conditions (e.g. extreme heat or cold).

This plant guide is designed to highlight some of the more important plants for quail in Oklahoma. It includes both food-producing and cover-providing plants. However, because Oklahoma's vascular flora is so diverse, containing more than 2,400 species, additional plants not covered within this guide are used by quail. By learning about the plants in this guide, a quail manager will have a better understanding of how to increase the number of quail on their property. Further, information contained in this guide can help quail hunters locate ideal hunting areas or to identify foods found within harvested quail.

This guide contains species accounts for 70 plants. They are divided into grasses, forbs and shrubs/trees. For each species account, the following is provided: common name, scientific name, the plant family, origin (whether the plant is native or introduced), the distribution of the plant within Oklahoma, a description of the soils and general conditions of where the plant might occur, how quail use the plant and other considerations, such as how to manage the plant. An image of the plant and the seed it produces is also provided. For each seed image, the approximate seed size is listed along with a silhouette for visual reference of its size. In some cases, there are multiple closely related species within a genus of plants that fill similar roles for quail. In those cases, we use the term "spp." to indicate when multiple species within a genus of plants is implied. Additionally, the term "sp." is used to indicate when the species of the plant is not known.

The identification of plant seeds can be a challenge even for the most experienced seed-savvy veterans and plant professionals. The color, texture, shape and size of nearly all seeds can vary, especially across different soil types and weather extremes. Identifying seeds from quail crops can have an increased level of difficulty as some seeds can swell to twice their original size when moist or they may be broken into pieces before being consumed. In addition, grass seeds can be consumed by quail before they dislodge from their accompanying florets and forbs seeds have husks that may or may not have weathered off prior to consumption. Therefore, the seed sizes (listed parenthetically after each common name) and shapes within this guide should be considered an average

seed size and shape for each species. Overall, noting the size, shape and location of the hilum (point of seed attachment) can be very helpful. Additional helpful identifying marks can include the surface texture, overall shape, presence or absence of hairs or hair-like projections, notable discolorations and irregular surface angles.

This guide also contains two appendices: a listing of insects that are important to quail and references used to create this guide.

We hope that you find this guide useful and encourage the reader to further explore the plants of Oklahoma. You cannot effectively understand and manage wildlife without a good understanding of plants. If you have additional questions about quail ecology and management, contact your local Oklahoma Department of Wildlife Conservation biologist or your local Oklahoma Cooperative Extension Educator.

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Grasses and Grass-Like Plants

Top: Sand Bluestem (Andropogon gerardii var. *incanescens*)
Bottom: Big Bluestem (*Andropogon gerardii*)

Actual seed size – 1/5”

Common Name: Big Bluestem, Sand Bluestem, Turkeyfoot

Scientific Name: *Andropogon gerardii*

Family: Poaceae, Grass Family

Origin: Native

Distribution in Oklahoma: Across the state.

Site Description: While big bluestem has a preference for clay or loamy soils, the very similar sand bluestem occurs in sandy soils. Both prefer full sun and are characteristic of the late stages of plant succession. They are common within prairies, savannas, glades and open forests.

Plant Description: These 3- to 9-foot tall grasses are recognized by their bunchgrass habit; soft, hairy leaves; and tall stems that terminate in two to seven (typically three) turkeyfoot-shaped ascending flowering branches. Big bluestem flowers from July through October.

Quail Use: The tall, bunchgrass habit of big bluestem offers excellent year-round cover for quail, though the tall stems become weak and may fall over during the winter months. Upland game birds, including quail, are known to use big bluestem for nesting, and dense stands can provide winter cover. Although the seeds are rarely a dominant food source for quail, the plants attract insects that quail eat including grasshoppers, leafhoppers, aphids, stink bugs, jewel beetles and caterpillars of several skipper butterflies.

Other Considerations: Big bluestem is highly palatable to all livestock and decreases when heavily grazed. In addition, the plants are sensitive to disturbance and will decrease through plowing, land clearing and when eastern redcedar trees invade. Big bluestem is a fire-adapted species and may dominate prairies and open forest communities that are burned with a high frequency. It can become so dense that the quality of habitat declines for quail due to the lack of open ground and forbs.

Broomsedge Bluestem
(*Andropogon virginicus*)

Actual seed size – 1/12”

Common Name: Broomsedge Bluestem, Broomsedge

Scientific Name: *Andropogon virginicus*

Family: Poaceae, Grass Family

Origin: Native

Distribution in Oklahoma: Found in the eastern three-fourths of the state, but most abundant in the southeast.

Site Description: Broomsedge bluestem prefers full sun and dry conditions, but can tolerate partial shade and moist soils. It occurs within prairies, open upland forests, glades, abandoned fields, pastures and barren areas including areas with clay, sand, gravel or rocky material. They can inhabit all stages of plant succession, including sites with low fertility.

Plant Description: Broomsedge bluestem can grow to more than 4 feet in height and is recognized by its bunchgrass growth form, persistent straw-colored older leaf and stem remnants with flattened stem bases and its inconspicuous white, fuzzy florets that are largely concealed by the upper leaves. They bloom from August through October.

Quail Use: The dried-out foliage of broomsedge bluestem remains intact and persists well through the winter months allowing these grasses to have year-round cover value. Its bunchgrass form is readily used by nesting quail and the plants have a high frequency of occurrence within bobwhite winter feeding, roosting and loafing sites. The seeds are occasionally consumed by bobwhite, especially during the fall and winter, but are not considered an important food source. Broomsedge attracts a variety of insects including leafhoppers, leaf beetles, skipper butterflies, thrips, aphids and grasshoppers.

Other Considerations: Broomsedge bluestem increases early on cleared forest land and on fallow agricultural fields, as it reproduces well from seed. It can provide important cover for quail on sites lacking other perennial warm-season native grasses. The plants offer poor forage for livestock and increase within areas that are heavily grazed. Broomsedge bluestem also benefits from burning, especially frequent fire, where it can become too dominate for quail. It will begin to decline without fire or another source of soil disturbance after only a few years.

Rescuegrass (*Bromus catharticus*)

Actual seed size – 1/2”

Common Name: Rescuegrass

Scientific Name: *Bromus catharticus*

Family: Poaceae, Grass Family

Origin: Introduced

Distribution in Oklahoma: Across the state.

Site Description: This cool-season grass is adapted to a variety of soil types including rocky or sandy, but prefers disturbed soils with full sun or lightly shaded conditions. It is an early successional species that will increase through mowing, plowing or grazing. Rescuegrass is found within gravel lots, rights-of-way, agricultural fields, pastures, lawns and roadsides.

Plant Description: Rescuegrass grows from 1 to 2 feet tall and is recognized by its flattened, green and yellow, openly branched seed heads that usually have a nodding appearance. These grasses grow through the fall and winter and flower during spring.

Quail Use: These short-lived tufted grasses deteriorate during the summer months and do not provide adequate nesting cover for quail. However, large stands provide limited cover during the spring when other plants remain dormant. The seeds or caryopses are eaten by quail during the summer months and to a lesser extent in the fall, but their availability is scarce by winter. The green leaves are also consumed by quail during the late winter and early spring. Various leaf beetles, chinch bugs, grasshoppers and aphids are attracted to these grasses and can be important in quail diets.

Other Considerations: Rescuegrass is consumed by livestock, especially during the early spring, but is considered a weedy invader of rangelands. It readily reseeds and can form dense stands. Controlling this non-native species is best accomplished by preventing a seed crop for at least two years. Regular spring burning, especially after the majority of seeds have germinated, will decrease the cover and frequency of these plants. Similar to other annual bromes, it can also be controlled with a grass selective herbicide such as Clethodim.

Giant Sandreed (*Calamovilfa gigantea*)

Actual seed size – 1/5”

Common Name: Giant Sandreed

Scientific Name: *Calamovilfa gigantea*

Family: Poaceae, Grass Family

Origin: Native

Distribution in Oklahoma: Western half of the state.

Site Description: Giant sandreed grows in loose, sandy-textured soils. The plants are characteristic of the early to mid-stages of plant succession, but are slow to mature as they put the majority of their resources into root development.

Plant Description: This robust grass grows from 3 to 8 feet in height and is recognized by its thick stems, long tapering leaves and extremely large flowering heads, which are triangular to diamond shaped in outline. Its presence within areas of loose sand can also help identify this species. The plants flower from June through October.

Quail Use: The seeds and florets are occasionally consumed by bobwhite and scaled quail, especially during the fall and winter months. In addition, the plants attract a variety of important insects that are high-use quail foods, especially grasshoppers and stink bugs.

Other Considerations: Its ability to form large clumps and spread via underground stems makes giant sandreed excellent for controlling erosion in areas of loose sand. The plants have a high tolerance to heat and drought. Giant sandreed is highly palatable to livestock and its cover value for quail is greatly reduced when areas are heavily grazed or cut for hay. Establishing giant sandreed communities by seed is a slow process because the seedlings distribute the majority of the resources into root development before producing an abundance of aboveground cover, as is typical with most perennial grasses.

Schweinitz's Flatsedge (*Cyperus schweinitzii*)

A: Schweinitz's Flatsedge
B: Great Plains Flatsedge
C: Oneflower Flatsedge

Actual seed size – 1/12"

Common Name: Flatsedge, Nutsedge

Scientific Name: *Cyperus* spp.

Family: Cyperaceae, Sedge Family

Origin: Native

Distribution in Oklahoma: Across the state.

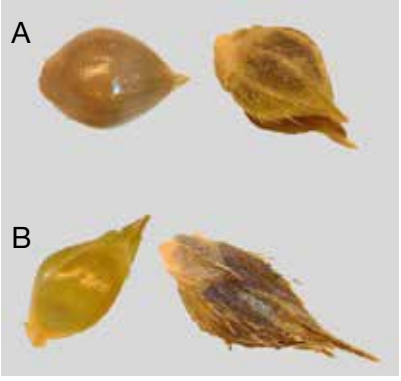
Site Description: Most flatsedge species can occur within a variety of soil types and are characteristic of the early to mid-stages of plant succession. Many are associated with the moist soils of wetlands, ditches, depressions, streams, seeps and ponds, but some are only found within upland prairies and fields. The plants can grow in full or partial sun and do best in fertile loams, silts and sands.

Plant Description: Flatsedges can grow from 6 inches to more than 3 feet tall and are recognized by their grass-like growth, triangular-shaped stems and loose to dense clusters of elongated, but non-showy and often odd-shaped flowering heads. They can bloom from spring through summer.

Quail Use: Both bobwhite and scaled quail consume the seeds year-round, especially the seeds of the drier, upland plants in western Oklahoma. In addition, some dryland flatsedges have been noted as a minor component within bobwhite nest locations and, in general, provide fair growing season cover for quail. However, flatsedges occurring within low, moist locations can have added insect value during hot, dry periods by attracting caterpillars of moths, aphids, leaf beetles, seed bugs, weevils, bees and grasshoppers.

Other Considerations: Flatsedge seeds and root tubers are widely noted as important waterfowl foods. Nearly all flatsedge species have the ability to germinate quickly once soil conditions are optimum. Their seeds remain viable for decades and respond well to spring and summer drawdowns or when pond and lake margins dry during periods of heat and drought. They also benefit from spring and summer disking, especially within lowland areas. Because of their ability to adapt quickly to optimum soil conditions, they can spread aggressively and form moderately dense stands in bare, moist soils. The dry, upland sedges do not aggressively increase or decrease with burning, and the plants are occasionally grazed by cattle. Some flatsedges also benefit when stands of timber are clear-cut or aggressively thinned.

Barnyardgrass (*Echinochloa crus-galli*)



A: Jungle Rice
B: Awned Barnyardgrass

Actual seed size – 1/6”

Common Name: Barnyardgrass, Wild Millet, Cockspur, Jungle Rice

Scientific Name: *Echinochloa* spp.

Family: Poaceae, Grass Family

Origin: Native and introduced, depending on species.

Distribution in Oklahoma: Across the state.

Site Description: Most barnyardgrass species are characteristic of the early stages of plant succession. While they can occur in a variety of soils, fertile soils that are loamy or silty are preferred. Barnyardgrasses can be common within wet to moist sites including agricultural fields, ditches, prairies and open woodlands, as well as along the banks of rivers, streams, lakes and ponds.

Plant Description: The various species of barnyardgrass grow from 1 to 3.5 feet tall and are recognized by the overall shape of their narrow, triangular shaped flowering heads and short to long bristle-tipped flowers that are arranged on one side of each flowering branch. This grass lacks a ligule, which is an outgrowth at the junction of the leaf and stem that most grasses have. Their common occurrence within and bordering wet to moist sites can be helpful when identifying these grasses. Barnyardgrass blooms from July to September.

Quail Use: Barnyardgrass can form dense stands under optimum conditions, providing valuable cover for quail, especially during the summer and fall. While the grasses do not provide ideal nesting structure for quail, the plants have been identified as components of bobwhite night roosting cover. Additionally, the seeds are eaten by both bobwhite and scaled quail, and can be seasonally important food items during the fall and winter months. Because of their affinity for moist soils, barnyardgrasses can be important grasses for attracting insects during dry or drought periods, especially grasshoppers, leaf beetles, flea beetles, leafminers, skipper butterflies and aphids.

Other Considerations: Barnyardgrasses readily invade areas that have been recently disturbed. These plants require periodic disturbance to maintain. They respond well to spring and early summer disking, especially within dried portions of wetlands and other moist soil areas. In addition, they readily establish within exposed wetlands after spring and summer drawdowns. Barnyardgrass may be grazed when the plants are young, but offer poor forage for livestock once the grasses mature. The seeds provide outstanding waterfowl food.

Weeping Lovegrass (*Eragrostis curvula*)

Actual seed size – 1/16” •

Common Name: Weeping Lovegrass

Scientific Name: *Eragrostis curvula*

Family: Poaceae, Grass Family

Origin: Introduced

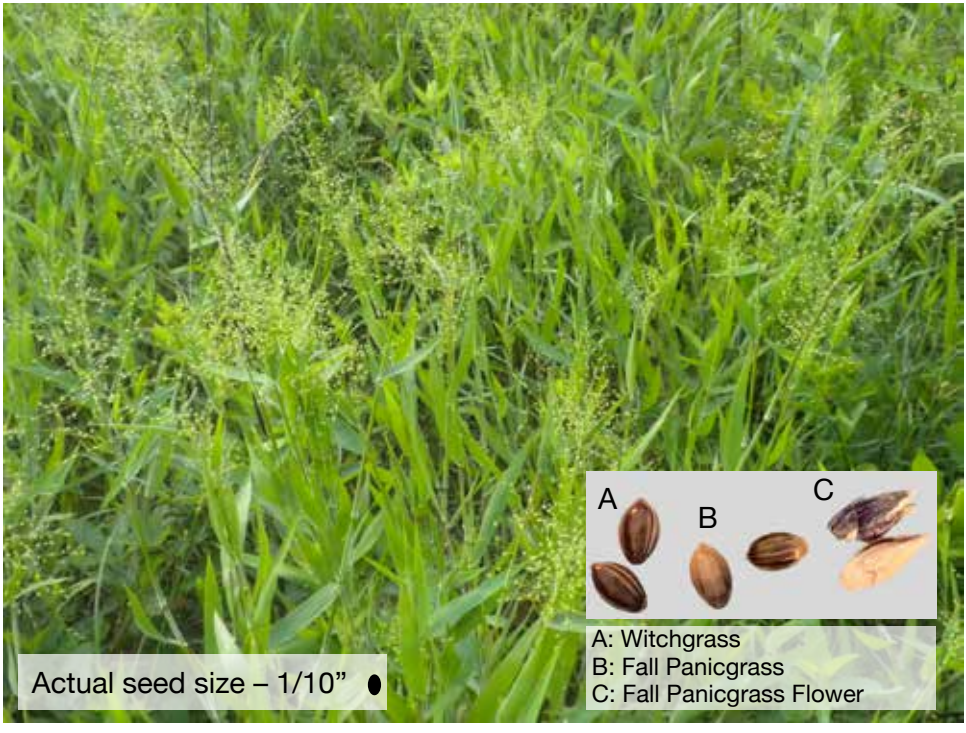
Distribution in Oklahoma: Across the state, but most common in western Oklahoma.

Site Description: Weeping lovegrass is adapted to a variety of soils, but grows best in well-drained, relatively fertile, sandy to clay loam soils. The plants prefer full sun conditions. Germination of seed appears to be best within sandy soils. It can be found within pastures, old fields and roadsides.

Plant Description: These non-native grasses grow from 2 to 6 feet tall and are recognized by their large bunchgrass form, which is often dead within its center; its tall, open, nodding flower heads; and its abundance of arching, narrow leaves. The plants flower from June to August.

Quail Use: Although these grasses are not native to Oklahoma, they are occasionally used as nesting sites for both scaled and bobwhite quail. Their long, arching leaves and bunch habit can provide escape cover, although older plants can have a matted appearance of dead vegetation, which is much less quail-friendly. The plant often forms monotypic stands, which limits food availability. Additionally, as it can become very dense, quail movement is greatly limited. The seeds are occasionally consumed by quail, but are not an important year-round food source. Leaf beetles, chinch bugs, planthoppers and aphids utilize various portions of these grasses, providing an insect source for quail.

Other Considerations: Being highly drought resistant and nutritious for livestock when the plants are young, weeping lovegrass has considerable value for some sites, especially erosion control projects. However, dense, monotypic stands can reduce overall habitat value by preventing the establishment of more important native plant species when it invades native grasslands. Heavy winter and spring grazing can help to suppress lovegrass plants and allow native plants to establish for quail, but overall, weeping lovegrass is difficult to control once established. The plants respond well to fire and disking because of their massive root system. Herbicides can help with control, but it must be done when the plants are actively growing.



Top: Witchgrass (*Panicum capillare*)
Bottom: Round-seeded Panicum (*Dichanthelium sphaerocarpon*)

Common Name: Panic Grass, Witchgrass

Scientific Name: *Panicum* spp. and *Dichanthelium* spp.

Family: Poaceae, Grass Family

Origin: Native

Distribution in Oklahoma: Across the state, depending on species.

Site Description: Panic grasses are common native species that are able to establish in sites with sand, gravel or clay, including barren and disturbed agricultural fields, field margins, roadsides, gravel lots, waterways and pastures. In addition, the plants establish within timber clear-cuts, but will decrease as more competitive plants establish. Most species are characteristic of the early stages of plant succession.

Plant Description: These grasses grow from 1 to 3 feet tall and most are recognized by their open, airy flowering heads that terminate into solitary flowers. The plants are often tufted, sending up multiple leafy stems from the same base. Panic grass blooms from May to October.

Quail Use: Panic grass seed is consumed by bobwhite and scaled quail and can be an important late summer, fall and winter food. The plants also provide limited cover during the growing season and into the fall. In addition to the seed value, the plants attract numerous insects including grasshoppers, aphids, leaf beetles, plant bugs, flea beetles and some butterfly and moth caterpillars.

Other Considerations: Some panic grasses tolerate periods of hot and dry weather, while others are restricted to areas with higher moisture. The plants are generally avoided by livestock and stands are common within areas that are heavily disturbed by cattle. Because panic grasses typically do not compete well for space, they rarely establish and persist without some type of soil disturbance except in sandy soils. Panic grass seeds persist within the soil for many years, ready to germinate when conditions are optimum.

Switchgrass
(*Panicum virgatum*)

A: Switchgrass
B: Mature Switchgrass Flower

Actual seed size – A 1/10”

Actual flower size – B 1/5”

Common Name: Switchgrass

Scientific Name: *Panicum virgatum*

Family: Poaceae, Grass Family

Origin: Native

Distribution in Oklahoma: Across the state.

Site Description: Switchgrass is a mid- to late-successional species that grows within areas of full sun and partial shade and is adapted to a variety of soils. The plants tolerate drier soils, but grow best in moist sites including loam, sand banks or clay prairies; open forests; forest edges; floodplains; rocky steam banks; roadsides; ditches and old fields.

Plant Description: This large clump-forming bunchgrass grows from 2 to 6 feet tall and is recognized by its stiffly ascending flowering heads, solitary flowers at the end of each branch and triangular tuft of hairs at the base of the leaf blades. Switchgrass blooms from July through September.

Quail Use: The height and abundant foliage of switchgrass have considerable year-round cover value for quail, including nesting cover from May through October. In addition, the bunchgrass form of switchgrass creates open space between clumps and allows for easy ground travel of adults and chicks. However, large dense stands of switchgrass provide poor habitat for quail due to the lack of forbs and the dense thatch. Like many members of the panic grass genera, switchgrass seeds are readily consumed by quail during the fall and winter as well as year-round, if available. Caterpillars of skipper butterflies consume switchgrass and the plants attract many other insects including plant bugs, aphids, leaf beetles, nematodes, grasshoppers, stink bugs, leafhoppers and thrips.

Other Considerations: Switchgrass is palatable and nutritious to livestock prior to reaching maturity and will decrease with intensive grazing. Because of its affinity to moist sites, switchgrass can provide cover for quail in wet areas that do not support other perennial grasses. The plants are highly tolerant of frequent burning regimes, especially winter and spring burning, but are less tolerant of summer fires. Occasionally, switchgrass establishes within ponds and wet areas that are drawn down during the early summer period. Switchgrass provides excellent winter cover for ring-necked pheasant.

Florida Paspalum (*Paspalum floridanum*)

A: Florida Paspalum
B: Mature Florida Paspalum Flower
C: Thin Paspalum

Actual seed size – A 1/6”
Actual flower size – B 1/5”
Actual seed size – C 1/8”

Common Name: Paspalum, Dallisgrass, Crowngrass

Scientific Name: *Paspalum* spp.

Family: Poaceae, Grass Family

Origin: Native and introduced.

Distribution in Oklahoma: Across the state.

Site Description: Many of Oklahoma's paspalum species are early to mid-successional plants that are adapted to a variety of soil types and wet to dry conditions. However, most do best in full sun. Thin paspalum is a widespread species that prefers sandy soils of prairies, open forests and old fields, while Florida paspalum typically occurs in moist soils of prairies, lightly wooded communities and along stream banks. Some paspalums are common yard weeds.

Plant Description: Paspalums are warm-season grasses that can grow from 1 to 5 feet tall and are recognized by their usually dense, one-sided flowering branches and rounded seeds, which attach to a zig-zag shaped and winged branch. Most paspalums have flowering branches that are alternately arranged along the stem, but some have branches that are opposite each other.

Quail Use: The lack of tall stems and leaves of various paspalum species limits their cover value for quail, but some species, including Florida paspalum, produce an adequate amount of aboveground foliage to provide cover during the growing season. Overall, the nesting value of paspalum grasses is low, though they have been identified as a component of nest sites during some quail studies. The seeds are readily eaten by bobwhite and scaled quail and can be an important fall and winter food item. Grasshoppers, aphids, beetles and the caterpillars of some butterflies are attracted to the many paspalum species.

Other Considerations: Paspalums, in general, are palatable and readily grazed by livestock, especially before the seeds mature. While little is known about the effects of fire on most paspalum species, some are known to benefit from high burn frequencies. Thin paspalum is drought hardy and one of the most commonly observed paspalums within Oklahoma, but the plants are difficult to establish through seeding because of low germination rates. Florida paspalum is well adapted to wet soils and can be used to control erosion along waterways.

Little Bluestem
(*Schizachyrium scoparium*)

Actual seed size – 1/5”

Common Name: Little Bluestem

Scientific Name: *Schizachyrium scoparium*

Family: Poaceae, Grass Family

Origin: Native

Distribution in Oklahoma: Across the state.

Site Description: Little bluestem is adapted to a variety of soils and conditions, including those that contain clay, gravel or sand. These grasses are characteristic of the mid- to late-stages of plant succession and is often the dominant grass in prairies, but also occurs within open forests, forest edges, glades, pastures and old fields.

Plant Description: Little bluestem grows from 2 to 4 feet in height and is recognized by its bunchgrass form, strongly flattened stem bases and many single, narrow, fuzzy, white branches that are attached individually atop each stem. The plants bloom from August through November and seeds can persist on the plants into the winter.

Quail Use: Little bluestem provides ideal nesting cover for quail and is identified as a preferred nesting component in many quail studies, likely due to its abundance. The plants hold up well to winter weather and have year-round cover value. The small seeds are occasionally consumed by quail, especially during the fall and winter. The plants attract a variety of valuable quail insect foods including caterpillars of skipper butterflies, leaf beetles, jewel beetles, planthoppers, grasshoppers, aphids, leafhoppers and scales.

Other Considerations: Little bluestem is palatable to livestock and readily eaten during the spring, but only fair for cattle forage later in the year. It is a fire-adapted species and declines with the absence of fire, but can dominate open forest communities that are exposed to frequent burning. The plants generally increase with frequent fire and can become so dense that forbs decline. Little bluestem decreases as forest canopies close in the absence of fire and forest thinning.

Knotroot Foxtail (*Setaria parviflora*)

Actual seed size – 1/8”

Common Name: Bristlegrass, Foxtail Millet, Foxtail Bristlegrass

Scientific Name: *Setaria* spp.

Family: Poaceae, Grass Family

Origin: Native and introduced, depending on species.

Distribution in Oklahoma: Across the state.

Site Description: Nearly all bristlegrass species are adapted to a variety of soil types and moisture conditions and grow in full sun. These early successional plants favor disturbed sites along ditches, roadsides, pond margins and fallow agricultural fields.

Plant Description: Bristlegrasses grow from 1 to 4 feet tall and are easily recognized by their elongated, bristly, hairy and straight to curving flowering heads that terminate the stems. The plants flower from July through October.

Quail Use: Bristlegrass seeds are consumed by northern bobwhite and scaled quail, particularly in the fall and winter. The plants provide limited cover during the summer and fall, but the stems weaken during the winter months and have less cover value. In addition, bristlegrasses have been identified as a common component within bobwhite night roosting cover. Leaf beetles, froghoppers, aphids, stink bugs and grasshoppers consume various portions of these grasses and are readily eaten by foraging quail.

Other Considerations: Nearly all of Oklahoma's native and introduced bristlegrass species benefit from soil disturbance and establish where bare ground has been exposed. The plants are often enhanced through spring and summer disking, although several undesirable species are also encouraged by summer disking. Bristlegrass also establishes within drying pond and lake margins after spring and early summer drawdowns. The plants tolerate occasional mowing, but this greatly reduces the seed production and cover these grasses provide. Livestock occasionally consume the foliage during the spring and early summer months, but the plants become unpalatable during late summer, which allows these grasses to flower and produce abundant seed for ground-foraging wildlife.

Johnsongrass (*Sorghum halepense*)

A: Mature Johnsongrass flowers
B: Johnsongrass

Actual flower size – A 1/6”

Actual seed size – B 1/8”

Common Name: Johnsongrass

Scientific Name: *Sorghum halepense*

Family: Poaceae, Grass Family

Origin: Introduced

Distribution in Oklahoma: Across the state.

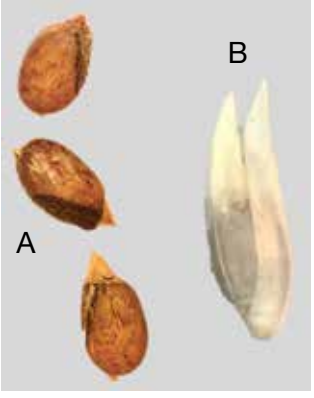
Site Description: Johnsongrass is tolerant of many soil types and conditions, but prefers full sun and moist, fertile loamy soils. Johnsongrass is an early successional species that readily establishes within areas of disturbance including roadsides, fallow fields, agricultural fields and rights-of-way.

Plant Description: These robust grasses grow from 2 to 7 feet tall and are recognized by their large maroon to shiny black mature fruiting heads and wide leaves with a prominent white midrib. Its ability to form large clonal communities can also aid in identification. Johnsongrass flowers from July through November.

Quail Use: Johnsongrass provides poor cover for nesting quail and, when growing in dense stands, can deter quail use altogether by reducing plant diversity and being too dense to move through. However, scattered small stands can offer good cover for feeding and resting throughout much of the year. The seeds are readily consumed by bobwhite and scaled quail from fall through spring and the plants attract a variety of insects including grasshoppers, skipper butterflies, leaf beetles, stink bugs, aphids and scales.

Other Considerations: This introduced grass is typically an undesirable plant due to its ability to form dense stands and spread aggressively. Although the plants have some cover and food benefits for quail, dense stands may require control. Various herbicides and heavy grazing can reduce its dominance. Disking communities of Johnsongrass from spring through summer is discouraged because this distributes actively growing root fragments and spreads the species. Johnsongrass provides high-quality forage for livestock, but can cause livestock toxicity when the plants are stressed. Finally, the seeds are a preferred food for mourning dove.

Tall Dropseed (*Sporobolus compositus*)



A: Tall Dropseed
B: Mature Tall Dropseed Flower

Actual seed size – A 1/16”

Actual flower size – B 1/4”

Common Name: Tall Dropseed, Meadow Dropseed, Composite Dropseed

Scientific Name: *Sporobolus compositus*

Family: Poaceae, Grass Family

Origin: Native

Distribution in Oklahoma: Across the state.

Site Description: Tall dropseed can grow within a variety of soil types, including those containing clay, loam or sand, but does especially well on calcium-rich soils such as limestone. It prefers areas of full sun, but also grows within lightly shaded open forest and glade communities. Prairies that are intermittently wet and dry may have an abundance of these grasses, but areas with a high water table will not support them. Tall dropseed is characteristic of mid- to late-stage plant succession.

Plant Description: Tall dropseed grows from 1 to 5 feet tall and is recognized by its inward rolled, long, drooping leaves that become thread-like toward the tip and by narrow flowering heads, which appear to be hidden within the stem. It flowers from August through November and many seeds can remain hidden within the stem sheaths throughout the winter.

Quail Use: The bunchgrass habit and long, outward curving leaves of tall dropseed provide cover for quail, especially during the summer, fall and early winter, but the plants have only fair nesting value for upland birds. In addition, the seeds and florets are consumed from the fall through early spring, but rarely make up a large portion of the year-round diet. Tall dropseed has insect value for quail, attracting many grasshoppers, aphids, and leaf beetles.

Other Considerations: Prescribed burning, especially at long-term intervals, has little impact on tall dropseed, but cover and frequency have been shown to decrease with frequent spring burning. The plants provide fair forage value for livestock, but palatability rapidly declines as the plants mature. Tall dropseed increases within heavily grazed sites.

Eastern Gamagrass
(*Tripsacum dactyloides*)

A: Mature Eastern Gamagrass Flower
B: Eastern Gamagrass

Actual flower size – A 1/3”

Actual seed size – B 1/6”

Common Name: Eastern Gamagrass, Gamagrass

Scientific Name: *Tripsacum dactyloides*

Family: Poaceae, Grass Family

Origin: Native

Distribution in Oklahoma: Scattered across the state, but most common in eastern Oklahoma.

Site Description: Eastern gamagrass prefers moist, well-drained soils, especially fertile loams, but is able to tolerate hot and dry weather because of its deep root system. This late-successional grass prefers full sun to partial shade conditions within wet to moist areas including prairies, ditches, stream banks, open floodplain forests, forest borders and abandoned fields.

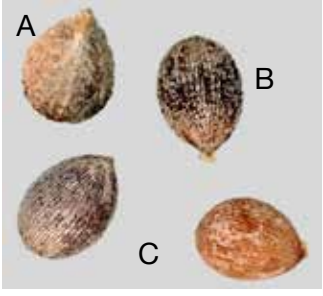
Plant Description: Eastern gamagrass grows from 3 to 7 feet tall and is recognized by its long, floppy leaves, which have a conspicuous white mid-vein and its one to three hardened, upright seedhead branches that produce jointed popcorn kernel-like grains on the lower portion. These plants flower from May through August and the mature grains rarely persist on the upright stems beyond November.

Quail Use: The seeds of eastern gamagrass are a minor food source for bobwhite, but the plants have considerable cover value, especially within moist soil areas where many native warm-season grasses cannot grow. In addition, its robust bunchgrass habit and ability to withstand winter weather also can provide important cover during those periods for many species of wildlife including ring-necked pheasant. Several insects are attracted to these grasses including leaf beetles, jewel beetles, gall flies, aphids, and some skipper butterflies, borers and billbugs.

Other Considerations: Although eastern gamagrass can be encountered statewide, its affinity for relatively undisturbed areas, especially with moist soil, limits its abundance. In addition, these grasses are highly nutritious and palatable to livestock and rapidly decrease with heavy grazing. While they are easy to propagate by dividing the root masses of existing plants, seeding new stands can be a challenge because the seeds have long, specialized dormancy requirements.

Forbs

Slender Three-seed Mercury
(*Acalypha monococca*)



A: Rough-pod Copperleaf
B: Virginia Mercury
C: Slender Three-seed Mercury

Actual seed size – 1/12”

Common Name: Copperleaf, Three-seed Mercury

Scientific Name: *Acalypha* spp.

Family: Euphorbiaceae, Spurge Family

Origin: Native

Distribution in Oklahoma: Across the body of the state.

Site Description: These early to mid-successional species establish within dry or moist soils and can grow in full sun or shade. They do particularly well in fertile bottomland soils, but also occur within sandy and rocky areas. These plants can occur within disturbed floodplain forests, stream banks, prairies, abandoned fields and roadsides.

Plant Description: The various copperleaf species can grow from 6 inches to more than 3 feet tall. They are recognized by their coppery-brown fall leaves and their non-showy flowers, which are hidden among leaf-like structures along the stem. Rough-pod copperleaf (*Acalypha ostryifolia*) has flowers in bristly-looking spikes. These plants flower from July to October.

Quail Use: The seeds of the various copperleaf species are consumed by bobwhite year-round, but especially during the fall and winter. The plants provide limited cover for quail during the summer, but their value is much less on poorer, drier soils where the plants are generally much shorter. Few insects have been noted for these plants as they are primarily wind-pollinated. Aphids, flea beetles and leaf beetles use the plants and the foliage is consumed by the caterpillars of some moths.

Other Considerations: Most copperleaf species benefit from soil disturbance, especially within fertile floodplains. They are avoided by livestock and suspected of causing livestock poisoning when consumed. Fire is an excellent tool to increase these plants, especially spring burning. In addition, spring disking favors the establishment of these species.

Spiny Pigweed
(*Amaranthus spinosus*)

A: Sandhill Amaranth
B: Prostrate Pigweed
C: Palmer Amaranth

Actual seed size – A, C 1/20” •

Actual seed size – B 1/18” •

Common Name: Pigweed, Amaranth

Scientific Name: *Amaranthus* spp.

Family: Amaranthaceae, Amaranth Family

Origin: Native and introduced, depending on the species.

Distribution in Oklahoma: Across the state.

Site Description: These early successional plants have a high affinity for disturbed areas including dry prairies, pastures, agricultural fields, field borders, fallow fields, farm lots and roadsides. They grow in a variety of moist to dry soils, but prefer loamy soils with high nitrogen levels. Overall, the size of these plants usually depends on the soil fertility and moisture.

Plant Description: Oklahoma's many pigweed species can grow from 1 to 6 feet in height and are recognized by their stout, often red-colored stems and elongated, non-showy, dense flowering branches. They flower from June to October and are prolific seed producers.

Quail Use: These tall, robust plants offer year-round cover for quail, but their cover value is much less during the winter and early spring months. Because they often grow in areas of exposed soil, the plants facilitate easy travel by adults with young broods, while providing good overhead cover, especially when occurring in dense stands. Pigweed is occasionally used as nesting cover. The tiny, black seeds are consumed year-round when available, but especially from summer through fall. Although the plants are primarily wind-pollinated, various insects use the plants including aphids, flea beetles, ground beetles, leaf beetles, grasshoppers, thick-headed flies and moths.

Other Considerations: Cattle are known to occasionally graze some pigweed species, but they are largely avoided and potentially toxic if consumed in large quantities. As such, they are considered invaders of pastures and grazed rangeland. Late winter/spring disking stimulates germination of the seed, and they readily establish within the exposed soils of wetlands, ponds and lakes after a spring or summer drawdown or drying period. The clear-cutting or heavy thinning of timber also benefits the establishment of these plants.

A: Giant Ragweed
B: Western Ragweed
C: Annual Ragweed
D: Lanceleaf Ragweed

Actual seed size – A, D 1/4 ”

Actual seed size – B 1/6 ”

Actual seed size – C 1/8 ”

Top: Western Ragweed (*Ambrosia psilostachya*)
Bottom: Giant Ragweed (*Ambrosia trifida*)

Common Name: Ragweed

Scientific Name: *Ambrosia* spp.

Family: Asteraceae, Sunflower Family

Origin: Native

Distribution in Oklahoma: Across the state, depending on species.

Site Description: Nearly all ragweeds are early successional species that can grow on a variety of soils. While most ragweeds do best in full sun and well-drained soils, giant ragweed tolerates shaded conditions and moist sites. Ragweeds can be common within grazed pastures, prairies, roadsides, areas of cleared timber and other disturbed sites.

Plant Description: Western (*A. psilostachya*) and common ragweed (*A. artemisiifolia*) grow from 1 to 3 feet tall and are recognized by their gray-green appearance, divided leaves and terminal, often yellow-tinted flowering branches. Lanceleaf ragweed (*A. bidentata*) has an abundance of lance-shaped, upward pointing leaves and giant ragweed (*A. trifida*) can grow to 8 feet or more and has large three- to five-lobed leaves. Ragweeds bloom from July to October and seeds can remain on the plants well into fall.

Quail Use: Ragweeds, in general, are considered some of the most important plants for quail, providing year-round food and cover. Their growth form and clonal habit provide excellent cover and the vast number of insects attracted to the plants make ragweed stands extremely important for brood-rearing. Grasshoppers, moths, leaf beetles, bees, froghoppers, stink bugs, longhorn beetles, aphids, gall wasps and leafhoppers use the plants in some way and the seeds of western and common ragweed are widely considered two of the most important quail foods in the state. Giant and lanceleaf ragweed seeds are also consumed, but to a much lesser degree. Western ragweed is also used for nesting cover in western Oklahoma. Dense stands of giant ragweed provide important shrub-like cover for quail during the fall and winter, particularly along crop field borders.

Other Considerations: Ragweed is consumed by livestock early in the season when plants are emerging, but it is generally considered poor forage for livestock because it contains alkaloid chemicals, which deter herbivory. As such, they are considered an invader of livestock grazed rangeland and can become common on areas that are intensely grazed. Western ragweed is a perennial plant and can persist even in the absence of disturbance. The plants also respond well to light disking, especially during the late winter and early spring. The cutting of timber, either through thinning or clear-cutting, is also a great way to improve habitat for quail and promote the establishment of various ragweed species. Ragweed pollen is a common allergen that affects humans. Ragweed is a good deer forage.

Pricklypoppy (*Argemone polyanthemos*)

Actual seed size – 1/12” ●

Common Name: Bluestem Pricklypoppy, Crested Pricklypoppy, Pricklypoppy

Scientific Name: *Argemone polyanthemos*

Family: Papaveraceae, Poppy Family

Origin: Native

Distribution in Oklahoma: Western two-thirds of the state.

Site Description: Pricklypoppy occurs on a variety of gravelly, sandy, loamy or clay soils and is characteristic of the mid-stages of plant succession. The plants are found within prairies, pastures and roadsides and prefer areas of full sun.

Plant Description: Pricklypoppy grows from 1 to 4 feet tall and is recognized by the pale blue-green cast of its foliage, the large white flowers with yellow centers and the abundance of slender yellow spines. When bruised, the plants ooze an orange-yellow sap, which can aid in its identification. Pricklypoppy blooms from June to August and some seeds are usually trapped within the capsules well into winter.

Quail Use: These upright, sometimes bushy plants provide cover for quail during the growing season and, to a lesser degree, during the winter months. Despite the seeds being somewhat toxic, they are occasionally consumed by bobwhite and scaled quail throughout the fall and winter. Many insects visit the plants including leaf beetles, bees, flies, moths, grasshoppers and jewel beetles.

Other Considerations: Nearly all portions of these plants are toxic and avoided by livestock. As a result, they increase with heavy grazing. They have a deep taproot and are highly tolerant of heat and drought. They do not transplant well. Little information is available on the effects of fire and disking on prickly poppy.

Green Milkweed
(*Asclepias viridis*)

A: Common Milkweed
B: Plains Milkweed

Actual seed size – A 1/3”

Actual seed size – B 1/4”

Common Name: Milkweed, Butterfly Weed, Antelope-horn

Scientific Name: *Asclepias* spp.

Family: Asclepiadaceae, Milkweed Family

Origin: Native

Distribution in Oklahoma: Across the state.

Site Description: Oklahoma's many milkweed species can occupy a variety of soil types, including sandy, gravelly and rocky. Most are mid- to late-successional species that grow within open forests, forest borders, prairies, glades and along roadsides.

Plant Description: Milkweeds are most notably recognized by their milky sap that exudes from damaged tissues, their rounded seed pods, which taper at both ends and their abundant brown, flat seeds with fluffy tufts of white hair. They can grow from 6 inches to more than 6 feet tall and have white, yellow, orange, purple or cream-colored flowers. Milkweeds flower from May into October and opened pods can remain on the stems well into winter.

Quail Use: In addition to providing valuable growing season cover, milkweed nectar attracts numerous insects including honeybees, digger bees, leaf-cutting bees and many butterflies and moths, especially monarch butterflies. In addition, grasshoppers, milkweed bugs, milkweed borers, longhorn beetles, aphids, wasps and weevils visit the plants. The very high insect value of these forbs makes them particularly valuable for brooding quail. The seeds are also consumed by both bobwhite and scaled quail, but usually in low quantities.

Other Considerations: Butterflies, especially the monarch, have been experiencing declining populations partially because of the decreasing number of milkweed plants across the landscape. Other insects are likely also impacted. The plants are rarely grazed by livestock and usually benefit from areas that are heavily grazed. Although little fire effect information is available for milkweeds, summer burning has shown to decrease the cover and frequency of some forest-dwelling species. Enhancing habitat for quail through milkweed seeding is best done in the fall, typically in November, to allow the seeds to experience cold temperatures and break their dormancy prior to spring.

Spanish Needles
(*Bidens bipinnata*)

Actual seed size – 2/3”

Common Name: Spanish Needles, Beggar Ticks, Pitchforks

Scientific Name: *Bidens bipinnata*

Family: Asteraceae, Sunflower Family

Origin: Native

Distribution in Oklahoma: Across the state.

Site Description: Spanish needles is adapted to a wide range of conditions, but has a preference for moist, fertile loamy soils, especially within disturbed floodplains and low forest areas. These early successional plants are also found along riverbanks and within abandoned fields.

Plant Description: These unique-looking plants grow from 2 to 5 feet tall and are recognized by their dissected, fern-like leaves, oblong yellow flowers and long, narrow pitchfork-like seeds, which readily cling to clothing. Spanish needles flowers from July to October and the "balls" of seeds can remain attached to the stem through the fall.

Quail Use: As with other *Bidens* species, Spanish needles can grow in small to large patches, providing growing season cover for quail. The seeds rarely make up a large portion of the year-round bobwhite diet, but are consumed during the fall and winter months. These honeybee nectar and pollen producing plants also attract other insects including leafminers, longhorn beetles, aphids, flies, leaf-cutting bees and the caterpillars of several moths.

Other Considerations: Many *Bidens* species are considered wetland plants and do best in full sun conditions. Spanish needles, however, occurs within drier sites and is very shade tolerant. They readily establish within forest areas that are clear-cut or heavily thinned. Light disking from January through March benefits the establishment of these plants, although they also respond to disking during other times of the year.

Showy Partridge Pea
(*Chamaecrista fasciculata*)

Actual seed size – 1/6”

Common Name: Showy Partridge Pea, Partridge Pea, Sensitive Plant

Scientific Name: *Chamaecrista fasciculata*

Family: Caesalpiniaceae, Caesalpinia Family

Origin: Native

Distribution in Oklahoma: Across the state.

Site Description: Showy partridge pea can occur in sands, loams or clays, but tend to favor poor soils and well-drained sandy soils of prairies and open forest habitats. These early successional plants also occur within abandoned fields, glades, roadsides and other disturbed sites.

Plant Description: These leafy legumes grow from 6 inches to more than 4 feet tall and are recognized by their numerous small leaflets, bright yellow flowers with maroon stamens, flattened seed pods and slightly pitted square-shaped seeds. They bloom from May to October and the half-opened seed pods can remain on the plants well into winter.

Quail Use: Showy partridge pea can form dense thickets, which provide excellent growing season cover, but the cover value diminishes after frost. Often, high numbers of insects are found on these plants, especially various bees, ants, aphids, butterflies, nematodes, grasshoppers and beetles. Solitary wasps also visit the plants to feed on the larvae of the many beetle species. The seeds are a year-round food source for quail, but they are most readily available from late summer into early winter.

Other Considerations: Showy partridge pea is excellent for planting on disturbed areas for erosion control. Stands require periodic disturbance from fire or disking to persist. Late winter and early spring burning is best to promote the establishment of new plants. Showy partridge pea also benefits from the clear-cutting and thinning of forest stands. This is a preferred forage for white-tailed deer.

Colorado Beeplant
(*Cleome serrulata*)

Actual seed size – 1/6”

Common Name: Colorado Beeplant, Rocky Mountain Beeplant, Beeweed

Scientific Name: *Cleome serrulata*

Family: Capparaceae, Caper Family

Origin: Native

Distribution in Oklahoma: Most abundant within the western half of the state.

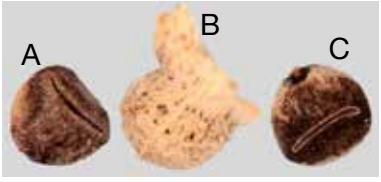
Site Description: Colorado beeplant can grow within full sun or lightly shaded conditions and prefers well-drained sandy soils. These early successional plants can be found within sandy prairies, scattered woodlands and disturbed roadsides and pastures.

Plant Description: These showy forbs grow from 1 to 6 feet tall and are recognized by their bright pink-purple flowers, leaves of three, long, drooping seed pods and slight odor. The plants bloom from July through September with the seeds maturing during the late summer and early fall.

Quail Use: Colorado beeplant can occur as single plants or form small stands, providing fair to good cover for quail during the growing season. However, cover at ground level can be thin when plants exceed 4 feet in height. Many insects seek the plants' attractive nectar, especially many species of bees and butterflies. Leaf beetles, aphids, thick-headed flies, spider wasps and spiders are also attracted to the plants. The seeds are consumed by bobwhite and scaled quail during the fall and winter.

Other Considerations: Very little is known about the effects of fire on Colorado beeplant, but the plants usually persist within grazed pastures as they are only occasionally grazed by livestock. The plants live just one year, growing quickly and dying with the first frost. They are highly tolerant of heat and drought. Seed is available commercially and can be sown after the first killing frost of the fall or during the early spring. However, germination can be poor so heavy seeding rates may be required, especially if not sown in a firm, weed-free seedbed.

Common Dayflower
(*Commelina erecta*)



A & C: Common Dayflower
B: Common Dayflower Seed with Husk

Actual seed size – A, C 1/7”

Actual husk size – B 1/6”

Common Name: Common Dayflower, Slender Dayflower, Whitemouth Dayflower

Scientific Name: *Commelina erecta*

Family: Commelinaceae, Spiderwort Family

Origin: Native

Distribution in Oklahoma: Across the state.

Site Description: Common dayflower is an early to mid-successional forb that prefers dry, sandy or rocky soils and can grow in full sun or lightly shaded areas. They usually grow singly or in small groups within prairies, dunes, open forests and forest edges.

Plant Description: These sparsely branched forbs can grow from 1 to 3 feet in height, but usually bend over and grow along the ground if much taller than 2 feet. They are easily recognized by their flowers which consist of two blue petals and one much smaller white petal. These plants bloom from May through October.

Quail Use: Individual plants are not heavy seed producers, but the seeds are highly sought after by both bobwhite and scaled quail when available. Larger numbers of seeds are eaten from summer through fall, but consumption is year-round if available. The plants provide growing season cover, especially when occurring in small patches, but the stems and leaves dry up during the winter. Bees, bee flies, leaf beetles, leafminers, butterflies and aphids are attracted to the plants providing additional feeding opportunities for quail.

Other Considerations: Common dayflower is drought hardy, blooming even during hot and dry periods. The plants are occasionally grazed by cattle and actually benefit from the disturbance of grazing, as it opens space for the plants to germinate and grow. White-tailed deer consume the foliage as well. These forbs benefit from disking, especially during the fall and winter, and establish within plowed or disturbed shrubland. Common dayflower has a varied response to burning, especially during the winter, most likely due to site specific conditions.

Top: Texas Croton (*Croton texensis*)
Bottom: Woolly Croton (*Croton capitatus*)

A: Texas Croton
B: Hogwort Croton
C: Glandular Croton

Actual seed size – 1/5”

Common Name: Croton, Hogwort, Doveweed

Scientific Name: *Croton* spp.

Family: Euphorbiaceae, Spurge Family

Origin: Native

Distribution in Oklahoma: Across the state.

Site Description: Crotons are characteristic of the early to mid-stages of plant succession. They occur on dry, sandy or rocky soils and soils of poor quality, including prairies, pastures, open forests, forest edges, areas of cleared timber and roadsides.

Plant Description: Crotons are 1- to 3-foot tall forbs and are recognized by their gray-green appearance, white, often very hairy flowers and, upon close inspection, star-shaped hairs common on the stems and leaves. They bloom from June through September.

Quail Use: The seeds of the various croton species are considered choice quail foods, readily eaten year-round if available, but especially during the summer and fall months when they are most available. The plants also provide growing season cover, including brood cover when occurring in larger densities. The caterpillars of some butterflies feed on the foliage, with plants also attracting bees, grasshoppers, leaf beetles, aphids and spiders.

Other Considerations: Crotons are largely avoided by livestock and increase in abundance within areas that are heavily grazed, sometimes forming dense stands. The plants are easily enhanced through light winter disking, establishing in disked or dozed fireguards as well as disturbed sand and gravel roads. Fire, particularly during the winter, benefits the establishment of croton. Many crotons also increase within forest areas that are aggressively thinned or clear-cut. Mourning doves are highly attracted to the seeds of croton, hence the name doveweed.

Winged Pigweed (*Cycloloma atriplicifolium*)

A: Winged Pigweed
B: Winged Pigweed Seed with Winged Husk

Actual seed size – A 1/16” •

Actual husk size – B 1/7” ●

Common Name: Winged Pigweed, Plains Tumbleweed

Scientific Name: *Cycloloma atriplicifolium*

Family: Chenopodiaceae, Goosefoot Family

Origin: Native

Distribution in Oklahoma: Across the western two-thirds of the state.

Site Description: Winged pigweed is an early successional forb that prefers dry sandy prairies, savannas, dunes, river banks and other barren areas. These plants prefer full sun and usually occur within sandy sites that have very little competing vegetation.

Plant Description: These abundantly branched forbs can grow from 6 inches to more than 3 feet tall and are recognized by their often rounded, tumbleweed-like form; small, lobed leaves and their small, but distinctive winged seed structures. They bloom from June to October and their overall plant size is very dependent on site conditions and presence of competing plants.

Quail Use: The seeds are consumed by bobwhite quail year-round when available. The plants rarely form large stands, but can form dense tumbleweed-like structures, which have some cover value. The leaves, however, can be quite narrow and small, which do not provide a substantial amount of overhead concealment. Little is known of insects associated with this plant, but aphids and scales have been observed on the foliage.

Other Considerations: Winged pigweeds detach at ground level to roll across the landscape, spreading their seeds as they go. They can be quick to establish within barren sand, but will decrease as more competitive plants establish. Individual plants can be quite small when growing in tight quarters, but open sandy sites can produce large, bushy specimens. Periodic disturbance, which exposes areas of bare sand generally benefit the establishment of these species. This plant should not be confused with Russian thistle (*Salsola tragus*, see page 97) which is also called tumbleweed. Russian thistle is an introduced and highly invasive plant and what most people call tumbleweed in the western U.S.

Illinois bundleflower
(*Desmanthus illinoensis*)

Actual seed size – 1/6”

Common Name: Illinois Bundleflower, Prairie Mimosa

Scientific Name: *Desmanthus illinoensis*

Family: Mimosaceae, Mimosa Family

Origin: Native

Distribution in Oklahoma: Across the state.

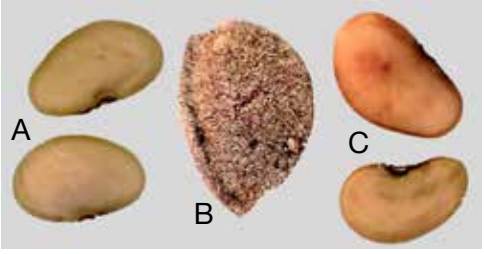
Site Description: Illinois bundleflower is an early to mid-successional plant that occurs in areas with a history of disturbance. The plants do not usually occur in coarse sands or dense clays, but are known to grow within a variety of wet or dry soils. It is found in prairies, open forests, stream banks, ditches and roadsides.

Plant Description: These 2- to 4-foot tall legumes are recognized by their numerous, tiny leaflets that fold up when touched and their rounded ball of strongly curved legume pods. The plants bloom from June to September and the seed pods can remain intact and on the plants well into the fall and early winter.

Quail Use: Large stands of Illinois bundleflower offer good cover for quail during the growing season, but the plants lose considerable cover value after frost. The seeds are consumed by quail from late summer through winter. The plants are hosts for some butterflies, but also attract weevils, leaf beetles, bees, flies, aphids and leafhoppers.

Other Considerations: Illinois bundleflower is commonly used in revegetation projects because the plants are easily established from seed. The foliage is high in protein and relished by cattle, often decreasing in abundance in grazed areas and absent altogether within overstocked range. The plants benefit from fire, including frequent fire, but repeated mowing reduces them. Although they endure wet soils, Illinois bundleflower does not persist within areas subject to extended periods of standing water.

Sessile-Leaved Ticktrefoil
(*Desmodium sessilfolium*)



A: Showy Ticktrefoil
B: Velvetleaf Ticktrefoil Pod
C: Velvetleaf Ticktrefoil

Actual seed size – A, C 1/6”

Actual pod size – B 1/5”

Common Name: Ticktrefoil, Desmodium

Scientific Name: *Desmodium* spp.

Family: Fabaceae, Bean Family

Origin: Native

Distribution in Oklahoma: Across the body of the state.

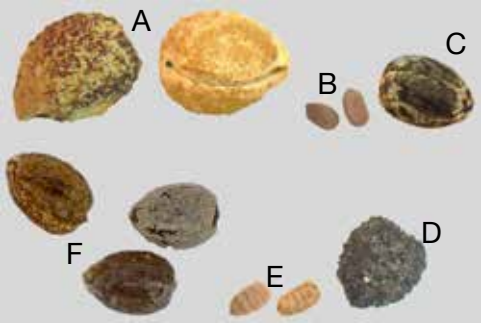
Site Description: Many ticktrefoils grow in sandy or loamy soils, especially fertile loam or clay loam soils. They occur within rocky sites in open forests and prairies. These legumes are mid- to late-successional plants with good drought tolerance. While some do best in full to partial sun conditions, other species do well in shaded sites.

Plant Description: Ticktrefoils can be quite variable in growth form, but these herbaceous legumes grow from 1 to 5 feet tall and are generally recognized by their sticky, velcro-like foliage, leaves of three and segmented seed pods which break apart and cling to clothing. These plants bloom from June to September.

Quail Use: Ticktrefoils have high cover value, particularly for brooding. However, cover declines after frost. Many insects visit the flowers or foliage including bees, leaf beetles, aphids, broad-headed bugs, weevils, grasshoppers, sawflies, soft-winged flower beetles and many butterflies and moths. Bobwhites consume the seeds year-round and these seeds, high in protein and fiber, can be an important fall and winter food.

Other Considerations: Many ticktrefoil species benefit from winter burning and usually have higher densities within areas that are subject to higher burn frequencies. However, spring burning is less beneficial for some ticktrefoil species. Cattle consume many species of ticktrefoil and heavy grazing can deplete these valuable legumes. Light disking stimulates new growth from the root crowns, but deep disking can destroy roots altogether. This is a highly preferred deer forage.

Snow-on-the-mountain
(*Euphorbia marginata*)



A: Snow-on-the-Mountain
B: Matted Sandmat
C: Prairie Sandmat
D: Fire-on-the-Mountain
E: Ribseed Sandmat
F: Sixangle Spurge

Actual seed size – A 1/5”
Actual seed size – B 1/24”
Actual seed size – C, D 1/8”
Actual seed size – E 1/18”
Actual seed size – F 1/7”

Common Name: Spurge, Sandmat, Snow-on-the-Mountain, Snow-on-the-Prairie, Euphorbia

Scientific Name: *Euphorbia* spp.

Family: Euphorbiaceae, Spurge Family

Origin: Native

Distribution in Oklahoma: Across the state.

Site Description: Most spurges are early to mid-successional species that occur within slightly moist to dry soils, but are adapted to a variety of soil conditions. Some species thrive within poor, disturbed sites and others are common within prairies, open forests, forest edges, glades, abandoned fields, cultivated fields, gravel lots and areas of cleared timber. One of the most common species, snow-on-the-mountain (*Euphorbia marginata*), is frequent within disturbed clay soils.

Plant Description: Some spurge species hug the ground, while others grow more than 3 feet tall. They are generally recognized by the milky sap that oozes from damaged plant parts, their green to white-colored small flowers and their three-lobed, often nodding fruits. In addition, many of the ground-hugging plants have red-colored stems and some of the upright spurges have white-margined leaf-like structures, known as bracts, which surround the blooming and fruiting flowers. Spurges bloom from June to October.

Quail Use: The cover value of the many spurge species varies depending on their growth habit and their output of aboveground foliage. While ground-crawling species provide minimal cover, larger plants like snow-on-the-mountain have considerable cover value during the summer, especially when growing in patches. Regardless of size, all spurges attract a large variety of insects, which can be important during the brood-rearing period. Aphids, scales, stink bugs, bees, butterflies, moths, leaf beetles, hoverflies, milkweed bugs, plant bugs, grasshoppers and spider wasps all consume various portions of these plants. In addition, the seeds are high in fat and fiber and can be important year-round foods for bobwhite and scaled quail, especially from summer through winter when they are most available.

Other Considerations: Spurges, in general, offer poor forage for livestock and can be toxic if consumed in large enough quantities. As a result, they can increase within areas that are subject to heavy grazing pressure. Seedling establishment can be enhanced through burning for some spurge species, but many do not readily increase or decrease after fire. Summer burning tends to increase snow-on-the-mountain. In addition, light disking can stimulate the germination of some of these plants.

Eastern Milkpea (*Galactia regularis*)

Actual seed size – 1/6”

Common Name: Eastern Milkpea, Downy Milkpea

Scientific Name: *Galactia regularis*

Family: Fabaceae, Bean Family

Origin: Native

Distribution in Oklahoma: Eastern half of the state.

Site Description: Eastern milkpea prefers sandy or rocky soils and occurs within dry upland forests, forest edges, savannas, glades and prairies. They are characteristic of the mid-stages of plant succession.

Plant Description: These herbaceous vines grow from 1 to more than 5 feet in length. They have hairy, twining stems, three oval- to oblong-shaped leaflets per leaf stalk and flowers with a noticeable white patch at the base of the largest petal. They flower from May through September.

Quail Use: Eastern milkpea's habit of growing low to the ground limits its cover value for quail, but twining stems climb other plants and provide some aerial cover during the growing season. The multi-colored seeds are readily consumed by bobwhite and are a seasonally important food source from late summer through early winter when they are most available. Bees, leafhoppers, weevils, aphids and moths are attracted to the leaves and flowers providing additional food for quail.

Other Considerations: Eastern milkpea can persist within unburned communities, but the plants tend to increase within areas that are periodically burned. Closed forests rarely support the plants, but forest practices that open the canopy, including thinning and clear-cutting, benefit these legumes. Cattle will graze the stems and leaves.

Carolina Geranium
(*Geranium carolinianum*)

Actual seed size – 1/10”

Common Name: Carolina Geranium, Carolina Cranesbill, Wild Geranium

Scientific Name: *Geranium carolinianum*

Family: Geraniaceae, Geranium Family

Origin: Native

Distribution in Oklahoma: Across the body of the state.

Site Description: Carolina geranium grows within a variety of soil types. It is characteristic of the early to mid-stages of plant succession, and often occurs in roadsides, agricultural fields, pastures, fallow fields, areas of cleared timber and unmaintained yards.

Plant Description: These low-growing forbs rarely grow more than 1 foot tall and are recognized by their highly lobed, often five-parted leaves; tiny pink flowers; and stems that branch at ground level. When mature, the fruits split and curl and, as a whole, can resemble an upturned umbrella. Carolina geranium blooms from March through July.

Quail Use: Carolina geranium plants grow close to ground level and provide limited cover for quail. However, the seeds usually germinate during the fall and the overwintering green foliage is consumed by quail during the winter and early spring. In addition, the seeds are also eaten by bobwhite throughout the year, but especially from spring through summer. Many insects seek nectar from the flowers, including short-tongued bees, long-tongued bees and flies. Aphids also suck juices from the plants.

Other Considerations: Carolina geranium is grazed by livestock and benefits from grazing disturbance as the plants are able to germinate and establish within exposed soil. In addition, the plants benefit with light disking, including the disking of fireguards. Geraniums will establish after fire, especially within gravelly or sandy sites. However, the plants will decrease in the absence of disturbance.

White Avens (*Geum canadense*)

Actual seed size – 1/3”

Common Name: White Avens

Scientific Name: *Geum canadense*

Family: Rosaceae, Rose Family

Origin: Native

Distribution in Oklahoma: Scattered across the body of the state.

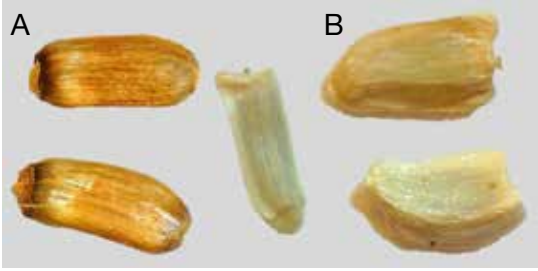
Site Description: White avens is an early to mid-successional species that prefers lightly shaded sites and moist to slightly dry soils, especially loam or clay-loam soils. They are found within floodplain forests, forest edges and occasionally within drier upland forests and wooded fencerows.

Plant Description: These plants grow from 1 to 2.5 feet in height and are recognized by their serrated, often three-parted stem leaves, five widely separated white flower petals and ball-shaped cluster of seeds, each with a long, hooked beak. They bloom from April to June and the clusters of achenes can hold together well into the summer and fall.

Quail Use: Most of the foliage occurs close to the ground and loose colonies offer cover for bobwhite especially within forest edges. The hooked achenes are consumed by bobwhite from summer through winter and the plants attract various insects including bees, froghoppers, sawflies, leaf beetles, aphids and wasps.

Other Considerations: White avens adapts well to disturbed forest sites and can form small colonies under optimum conditions. The plants are somewhat short-lived, so any disturbance during the growing season, including mowing, can decrease the species through time, especially when it prevents seeds from maturing. The plants benefit from longer burn intervals rather than frequent fire regimes, and plants are favored by dormant-season burning. The plants tolerate periodic flooding, but will not persist under prolonged inundation.

Curlytop Gumweed
(*Grindelia nuda*)



A: Spanish Gold
B: Curlycup Gumweed

Actual seed size – A 1/12”

Actual seed size – B 1/10”

Common Name: Gumweed, Goldenweed

Scientific Name: *Grindelia* spp.

Family: Asteraceae, Sunflower Family

Origin: Native

Distribution in Oklahoma: Across the state, depending on species.

Site Description: Gumweed is an early successional species that favors dry areas, but can grow in moist soil areas that have little other competing vegetation. The plants occur on a variety of soils including sandy loams and clay loams. They occur on heavily grazed pastures, dry prairies, depleted rangeland and roadsides.

Plant Description: These erect forbs grow from 1 to 3 feet tall and are recognized by the gummy feel of their clasping leaves with saw-toothed margins and their numerous downward curved leaf-like structures that occur immediately below the yellow flowers. They bloom from July to October.

Quail Use: The stout stems of gumweed hold up well during the fall and winter and the plants provide year-round cover for quail, especially when forming large stands. The seeds are readily consumed by bobwhite and scaled quail, especially from fall through winter, but year-round if available. Despite the foliage being quite gummy, many insects use these forbs including bees, leaf beetles, weevils, flies, stink bugs, aphids, grasshoppers, moths, spiders and soft-winged flower beetles.

Other Considerations: The foliage of gumweed contains alkaloids and is unpalatable to livestock, though extremely small quantities may be grazed when the plants are very young. Pastures and rangeland sites that are intensely grazed may have extensive stands of this plant. They also have a very high tolerance to drought and can dominate in sites with little competing vegetation, especially in shallow soils. Little is known of the effects of fire on these plants, but they can establish within lightly disked areas.

Annual Broomweed
(*Gutierrezia dracunculoides*)

Actual seed size – 1/12”

Common Name: Common Broomweed, Prairie Broomweed, Annual Broomweed

Scientific Name: *Gutierrezia dracunculoides*

Family: Asteraceae, Sunflower Family

Origin: Native

Distribution in Oklahoma: Across the state.

Site Description: Common broomweed is an early successional species that can grow on a variety of soil types including sands, loams and clays. They are found within upland prairies, glades, pastures, utility rights-of-way, fallow fields, roadsides, disturbed sites and adjacent to streams.

Plant Description: These annual forbs can grow from 1 to more than 3 feet tall and are recognized by their numerous tiny yellow flowers, very narrow leaves and upside-down, broom-like appearance. Normally, the plants have a single stem below, which branches profusely a foot or so above the ground. Common broomweed blooms from August through October.

Quail Use: The tiny seeds of common broomweed are a fall and winter food source for bobwhite and scaled quail, occasionally numbering in the hundreds in a single quail crop. Its tree-like form facilitates easy travel for quail below the broomweed canopy, and dense stands can provide excellent growing season cover and fair winter cover. The plants are also occasionally used for nesting cover for scaled quail. Grasshoppers, bees, aphids, weevils and leaf beetles use the plants providing important insect foods for quail.

Other Considerations: Common broomweed is a classic indicator of disturbance and can form large populations on barren soils. In addition, the plants are avoided by livestock and can form dense communities on sites that are intensely grazed. They are tolerant of heat and drought and have shown a pattern to increase in abundance in wet years, especially when following dry years on heavily grazed areas. While many producers wish to control this plant, it is generally not advised because the plant quickly disappears once heavy disturbance ceases.

Annual Sunflower (*Helianthus annuus*)

A: Maximilian Sunflower
B: Plains Sunflower
C: Annual Sunflower
D: Hairy Sunflower

Actual seed size – A, B 1/5”

Actual seed size – C 1/4”

Actual seed size – D 1/6”

Common Name: Sunflower

Scientific Name: *Helianthus* spp.

Family: Asteraceae, Sunflower Family

Origin: Native

Distribution in Oklahoma: Across the state.

Site Description: Sunflowers grow in a variety of soils and most species are found in the early stages of plant succession. The plants prefer dry, disturbed clays or heavy sands, but will grow in moist soils and poor soils. They are found in dry prairies, fallow fields, field margins, roadsides and areas of cleared timber.

Plant Description: These tall, coarse, leafy forbs grow from 2 to 8 feet tall and are recognized by their large, long-stalked leaves and large yellow flowers with red-brown or yellow centers. The plants also have rough-textured stems that branch within the upper portion. Sunflowers bloom from July to September.

Quail Use: Sunflower is one of the most important wildlife foods in the state, especially for quail. Dense stands can provide important cover, especially during the growing season, but its cover value declines after frost. The high-energy seeds are eaten by bobwhite and scaled quail year-round if available, but are highly sought after by many birds and mammals and few seeds last beyond the early winter months. It is not uncommon to see quail crops filled entirely with sunflower seeds during the fall months. Grasshoppers, stink bugs, bees, leafminers, butterflies, moths, spider wasps and thick-headed flies utilize various portions of the plants, often in large numbers.

Other Considerations: Sunflower is palatable and readily eaten by livestock, therefore its abundance within heavily grazed range is usually limited. The plants, however, are drought tolerant and spread rapidly by re-seeding, benefiting from light disking. Frequent mowing and deep plowing can prevent these annual plants from establishing and producing seed, which greatly limits their growth and value for game birds. Some species of sunflower are a highly preferred forage for white-tailed deer.

Camphorweed
(*Heterotheca subaxillaris*)

Actual seed size – 1/8”

Common Name: Camphorweed, False Goldenaster

Scientific Name: *Heterotheca subaxillaris*

Family: Asteraceae, Sunflower Family

Origin: Native

Distribution in Oklahoma: Across the state.

Site Description: Camphorweed is an early successional species that grows best in sandy soils and can be found in disturbed prairies, pastures, abandoned fields and roadsides.

Plant Description: These 1- to 3-foot tall plants are recognized by their very hairy stems and leaves, abundant yellow flowers and camphor-like odor when bruised or crushed. They bloom from May to October and produce two very dissimilar-looking types of seeds.

Quail Use: Loose to dense stands of camphorweed provide excellent cover from spring into the fall, but the stems and dried leaves often persist into the winter months to provide winter cover. Honeybees, mining bees, plant bugs, fruit flies, thick-headed flies, grasshoppers, aphids, scales, leaf beetles and moths are attracted to the plants and the seeds are consumed by bobwhite and scaled quail, especially from summer through winter, when they are most available.

Other Considerations: Camphorweed produces two different types of seed, both with different germination requirements that allows the plants to be very effective in thriving both in periods of drought and years of adequate moisture. Disking may control the germination of one seed, but stimulate the germination of the other. The plants are largely avoided by livestock and increase within rangeland subject to heavy grazing.

Scarlet Pea (*Indigofera miniata*)

Actual seed size – 1/8”

Common Name: Scarlet Pea, Coastal Indigo, Texas Indigo

Scientific Name: *Indigofera miniata*

Family: Fabaceae, Bean Family

Origin: Native

Distribution in Oklahoma: Statewide, but widely scattered within the eastern half.

Site Description: Scarlet pea can occur within sand, loam or clay soils, but flourishes within sandy well-drained soils. These mid-successional legumes are found within open woodlands, prairies, old fields and unmaintained roadsides.

Plant Description: These low-growing legumes sprawl across the ground and can spread to more than 2 feet in length. They are recognized by their salmon-pink flowers, numerous hairy leaflets and rectangular-shaped seeds. Scarlet pea blooms from May to September.

Quail Use: Dense patches of these legumes, especially when crawling over other vegetation, provide cover during the growing season. Their low growth and insect value can be especially important for young quail broods. Stink bugs, aphids, leaf beetles, leafhoppers, broad-headed bugs and caterpillars of several butterflies use the plants. The seeds are readily eaten by bobwhite and scaled quail when available, but especially during the late summer, fall and early winter months.

Other Considerations: Scarlet pea does best in full sun, but tolerates some shade and is highly tolerant of heat and drought conditions. Occasionally, these legumes establish within lightly disked areas and will tolerate periodic burning. Scarlet pea is highly desirable to livestock and will decrease within areas that are heavily grazed.

Top: Korean Clover (*Kummerowia stipulacea*)
Bottom: Japanese Clover (*Kummerowia striata*)

A: Korean Clover
B: Japanese Clover

Actual seed size – A 1/14”

Actual seed size – B 1/12”

Common Name: Korean Clover, Korean Lespedeza, Japanese Clover

Scientific Name: *Kummerowia stipulacea* (Korean)*, Kummerowia striata* (Japanese)

Family: Fabaceae, Bean Family

Origin: Introduced

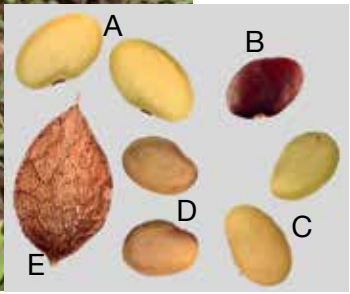
Distribution in Oklahoma: Primarily within the eastern two-thirds of the state.

Site Description: These early successional species grow best within well-drained, fertile soils and are adapted to a variety of soil types including sand and clay. However, eroded sites and other infertile soils also support them. Korean and Japanese clovers often occur within old fields, pastures, hayfields, open woods, disturbed prairies and roadsides.

Plant Description: Korean and Japanese clovers rarely grow more than 16 inches tall and are primarily recognized by their freely-branched, low-to-the-ground growth form, pink to purple small flowers and conspicuously veined leaflets in groups of three. Both species flower from June through October.

Quail Use: The seeds of these introduced legumes are readily consumed by bobwhites when available and can be important food sources from late summer through fall. Although Korean and Japanese clovers are short in stature, they provide important night roosting and loafing cover for quail, especially during the winter months. Various beetles, leafhoppers, aphids and grasshoppers consume the plants and provide additional feeding opportunities for adult and juvenile quail.

Other Considerations: These clovers were introduced into North America as pasture forages and for soil conservation and are still occasionally planted today because they are easy legumes to establish. Korean and Japanese clovers are common within disturbed sites and their long-term persistence is generally limited to sites with some type of recurring disturbance, including grazing. Seed output of individual plants is highest within fertile soils, but can be negatively affected by drought and haying. October disking has been known to benefit these legumes. Limited information is available on the effects of fire on Korean and Japanese clovers.



Top: Slender Lespedeza (*Lespedeza virginica*)
Bottom: Sericea Lespedeza (*Lespedeza cuneata*)

A: Roundhead Lespedeza
B: Slender Lespedeza
C: Trailing Lespedeza
D: Sericea Lespedeza
E: Roundhead Lespedeza Pod

Actual seed size – A 1/8” ●
Actual seed size – B 1/10” ●
Actual seed size – C, D 1/12” ●
Actual pod size – E 1/4” ●

Common Name: Lespedeza, Bush Clover

Scientific Name: *Lespedeza* spp.

Family: Fabaceae, Bean Family

Origin: Native and introduced, depending on species.

Distribution in Oklahoma: Most abundant within the body of the state

Site Description: Most lespedeza species are mid- to late-successional plants that occur within a variety of soils, but especially medium to dry, sandy or rocky soils. They can be common within prairies, open forests, forest edges and clearings and relatively unmaintained roadsides. The non-native sericea lespedeza (*Lespedeza cuneata*) prefers clay and silt loam soils of disturbed prairie, open forests, thickets, roadsides and fertile soils of lake and pond margins.

Plant Description: Most lespedeza species grow from 1 to 4 feet tall, have three oblong to elliptic leaflets per leaf stalk and produce small cream to violet-colored flowers. However, some lespedeza species grow along the ground. While many other legumes produce multi-seeded pods, lespedezas produce one-seeded pods. These plants flower from July through October.

Quail Use: Lespedeza seeds, in general, are considered very important quail foods, especially within the eastern half of the state. However, the seeds of the non-native sericea lespedeza are not digestible by quail and therefore are detrimental if consumed because it wastes energy. Lespedezas provide good cover during the growing season, but aggressive, dense stands of sericea are considered poor cover because of the lack of plant diversity. Many insects use the plants including leafhoppers, grasshoppers, weevils, aphids, bees, butterflies and leaf beetles.

Other Considerations: Many of the native lespedezas are consumed by cattle and will decrease with heavy grazing. In addition, lespedezas benefit from fire as it stimulates germination of the seed. Some species of lespedeza benefit from timber stand improvements, which open the canopy and allow an abundance of sunlight to reach the forest floor. Sericea lespedeza is an aggressive invader, which will readily out-compete native plants. Control of this species has proven difficult and often requires multiple and timely applications of controlled grazing, burning and herbicide treatments. Note: the native slender lespedeza (*Lespedeza virginica*) is very similar in appearance to sericea lespedeza. The easiest way to distinguish one from the other is to hold a leaf up to light. Slender lespedeza has net-like leaf veins, while sericea veins resemble the structure of a feather. Additionally, some managers wish to establish the exotic bicolor lespedeza (*Lespedeza* bicolor) as it is purported to provide good cover and food for quail. This should absolutely be avoided because this plant can be invasive and difficult to manage.

Fringed Puccoon
(*Lithospermum incisum*)

Actual seed size – 1/6”

Common Name: Yellow Puccoon, Fringed Puccoon, Narrowleaf Stoneseed

Scientific Name: *Lithospermum incisum*

Family: Boraginaceae, Borage Family

Origin: Native

Distribution in Oklahoma: Scattered across the state.

Site Description: These mid- to late-successional forbs are adapted to a variety of soil types, but prefer full sun and dry, sandy or rocky soils. They are found within upland prairies, savannas, glades, pastures, relatively unmaintained roadsides and open forests.

Plant Description: Yellow puccoon can grow from 5 to 15 inches in height and is recognized by its wavy-margined yellow flower petals, linear-oblong leaves and shiny white to gray pitted seeds. They bloom from March to June, but are not heavy seed producers.

Quail Use: The short stems and linear leaves of these plants limit their importance as cover. However, their shortened height brings insects to quail-level. Insects attracted include mason bees, mining bees, aphids, longhorn beetles, grasshoppers and the larvae of several butterflies. Although these plants produce a relatively small amount of seeds, they are readily consumed by bobwhite and scaled quail when encountered.

Other Considerations: Although the plants produce an abundance of yellow blooms during the spring, few of these flowers produce viable seed. Instead, the plants produce small, late-summer flowers that never open, then self-pollinate and yield up to four seeds per flower. Yellow puccoon has proven difficult to increase because of its limited seed output and unreliable germination rates. The plants are tolerant of periodic burning, but do not appear to noticeably increase with the use of fire.

Yellow Sweetclover
(*Melilotus officinalis*)

A: Yellow Sweetclover
B: White Sweetclover

Actual seed size – 1/7”

Common Name: Sweetclover

Scientific Name: *Melilotus* spp.

Family: Fabaceae, Bean Family

Origin: Introduced

Distribution in Oklahoma: Across the state.

Site Description: Sweetclover is an early successional species that is common in areas with a history of disturbance, including disturbed prairies, abandoned fields, field margins and roadsides. They do best in slightly moist to dry conditions and can grow within sand, loam and clay soils.

Plant Description: The size of these plants varies, depending on soil moisture and fertility, but individual plants can grow more than 7 feet tall under optimum conditions. Sweetclover is recognized by its trifoliate, serrated leaves, elongated yellow to white blooming branches and sweet vanilla-like scent when crushed or mowed. They bloom from May to August, with yellow sweetclover blooming a few weeks ahead of the white variety.

Quail Use: Dense stands of sweetclover provide cover from summer through fall, and this cover can be especially attractive to adult quail with broods because of the high numbers of insects that use these plants. Bees, wasps, beetles, plant bugs, stink bugs, grasshoppers, aphids, leafminers, thick-headed flies, froghoppers, spiders and the caterpillars of several moths and butterflies all visit these legumes during the growing season. The seeds are readily consumed by quail.

Other Considerations: Although non-native, these legumes have become naturalized throughout much of the U.S., including Oklahoma. They readily establish within disturbed soils. Fire is known to stimulate germination of the seed and dormant-season fires may benefit the species. The plants are tolerant of alkaline soils, but they do not tolerate shade and will begin to decline as woody cover encroaches. This plant can be highly invasive in many areas. It is consumed by cattle and white-tailed deer.

Bractless Blazingstar
(*Mentzelia nuda*)

Actual seed size – 1/6”

Common Name: Blazingstar, Sand Lily, Star Flower

Scientific Name: *Mentzelia* spp.

Family: Loaceae, Stick-leaf Family

Origin: Native

Distribution in Oklahoma: Western half of the state.

Site Description: Blazingstars (often called sand lily in Oklahoma) are early to mid-successional species that occur on sandy, gravelly or rocky prairies, hillsides, bluffs, roadsides and disturbed ground. Some blazingstar species grow exceptionally well on gypsum soils.

Plant Description: Blazingstar plants have pale white to yellow flowers and, depending on the species, can grow from 6 inches to more than 5 feet tall. The stems and leaves are sticky with velcro-like hairs that cling to fur and clothing. The plants flower from July to September, with some seeds remaining trapped within capsules until spring.

Quail Use: While individual blazingstar plants can grow quite large, they rarely form large, extensive stands. Nevertheless, the plants have year-round cover value, especially during the growing season. The seeds are eaten by bobwhite and scaled quail from fall through spring, but don't generally make up a large portion of the year-round diet. Bees, weevils, moths, aphids, ants and leaf beetles are attracted to the flowers and/or foliage and provide insect feeding opportunities for quail.

Other Considerations: Blazingstars have strong, deep taproots and are very tolerant of heat and drought, but do not transplant well. Overall, they generally benefit from burning as the fire triggers the dormant seeds of some blazingstar species to germinate. Because the plants are mildly toxic, they are largely avoided by livestock and can increase within heavily grazed range.

Catclaw Sensitivebriar
(*Mimosa quadrivalvis*)

Actual seed size – 1/5”

Common Name: Catclaw Sensitivebriar, Fourvalve Mimosa, Sensitivebriar

Scientific Name: *Mimosa quadrivalvis*

Family: Mimosaceae, Mimosa Family

Origin: Native

Distribution in Oklahoma: Across the state.

Site Description: Catclaw sensitivebriar is adapted to a variety of soils, but is most abundant in dry, rocky or sandy soils of prairies, open forest communities and forest edges. These mid-successional species also can be found along roadsides and areas of cleared timber.

Plant Description: These sprawling legumes can grow more than 6 feet in length and are recognized by the numerous hooked prickles that cover the stem, pink puffball-like flowers and sensitive, small leaflets that fold up when touched. They flower from May through September.

Quail Use: The low growth of these plants limits their cover value. The seeds are readily consumed by quail year-round, if available, and can be important seasonally, especially from summer through the early winter months. Bees, grasshoppers, jewel beetles, leaf beetles, stink bugs, moths and gall wasps are attracted to these plants and are often very accessible to feeding quail because of the low growth of these legumes.

Other Considerations: Catclaw sensitivebriar is palatable and highly nutritious to livestock, especially before the prickles harden. As such, the plants decrease when heavily grazed and can be important rangeland indicators. The plants benefit when forest stands are heavily thinned or clear-cut, but little is known of the effects of fire on this species.

American Pokeweed
(*Phytolacca americana*)

Actual seed size – 1/8” ●

Common Name: American Pokeweed, Pokeweed, Pokeberry

Scientific Name: *Phytolacca americana*

Family: Phytolaccaceae, Pokeweed Family

Origin: Native

Distribution in Oklahoma: Across the state.

Site Description: Pokeweed is an early successional species with a preference for moist, rich, loamy soils, but they will grow in drier, poorer sites. They are generally found in disturbed areas of prairies, open forests, forest borders, thickets, fencerows, fallow fields, ditches, stream banks, vacant lots and areas of cleared timber.

Plant Description: These tall, branching forbs grow from 1 to 8 feet tall and are recognized by their reddish stems, large leaves and long, drooping clusters of small, white flowers that mature into purple-black berries. They flower from June through October.

Quail Use: Pokeweed thickets are readily used as cover by bobwhite during the summer. Large plants and dense stands also serve as good brood cover. The berries and seeds are consumed by many bird species, including quail, especially during the summer and fall. Many insects use the plants including aphids, harvester ants, leaf beetles, bees, flies and stink bugs.

Other Considerations: Pokeweed is consumed by white-tailed deer and cattle, especially early in the growing period. It readily establishes within sites that are subject to intense burning including slash piles and summer-burned clear-cuts. The seeds remain viable within the seedbank for decades and are quick to germinate following soil disturbance. Plants growing within dry, poor soils will be much shorter with fewer flowers and fruits.

Pennsylvania Smartweed
(*Polygonum pensylvanicum*)

A: Pennsylvania Smartweed
B: Climbing False Buckwheat
C: Bushy Knotweed

Actual seed size – A 1/7”
Actual seed size – B 1/5”
Actual seed size – C 1/8”

Common Name: Smartweed, Knotweed

Scientific Name: *Polygonum* spp.

Family: Polygonaceae, Knotweed Family

Origin: Native and introduced.

Distribution in Oklahoma: Across the state.

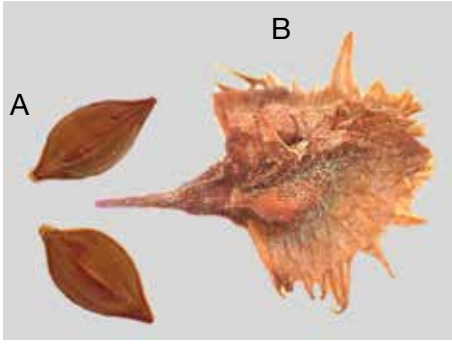
Site Description: Smartweeds occur within a variety of clay, loam and sandy soils with some flourishing in poorer sites where competition is sparse. They often occur in wet soils and occasionally within dry, upland sites. These early to mid-successional plants can be found within wetlands, ditches, low areas of cultivated fields, floodplains, stream banks and exposed pond and lake margins. Some upland species are also found within disturbed prairies and roadsides.

Plant Description: These erect or sprawling forbs can grow from a few inches to more than 4 feet tall and have white to pink flowers and black triangular to oval seeds. They often have swollen nodes along the stems that are surrounded by a thin, papery, elongated sheath. Smartweeds bloom from May to October.

Quail Use: Large smartweed colonies provide good cover for quail and, when not standing in water, offer brood cover for adults and chicks. However, the cover value of ground-hugging smartweeds is minimal. Because of their preference for moist sites, smartweeds are often green and lush, offering cooler conditions for quail and insects during periods of heat and drought. Some smartweeds have been identified as an important component of bobwhite night roosts. The seeds are consumed by bobwhite year-round, if available, but especially from summer through winter. Numerous insects use the plants including flea beetles, aphids, bees, plant bugs, stink bugs, weevils, planthoppers, wasps, flies, leaf beetles and many butterflies and moths.

Other Considerations: Smartweeds persist within grazed areas as they are only occasionally grazed by cattle. The plants commonly establish within seasonal wetlands as well as areas of standing water that dry up or are drawn down during the spring and early summer months. In addition, spring disking in wetland soils can stimulate smartweed production. Many are tolerant of soils with a high salt content and most withstand periodic flooding.

Curly Dock (*Rumex crispus*)



Actual seed size – A 1/8”
Actual fruit size – B 1/6”

A: Dock Seed
B: Dock Fruit
(Seed and fruit not identified to individual species.)

Common Name: Dock, Sheep Sorrel

Scientific Name: *Rumex* spp.

Family: Polygonaceae, Knotweed Family

Origin: Native and introduced, depending on species.

Distribution in Oklahoma: Across the state.

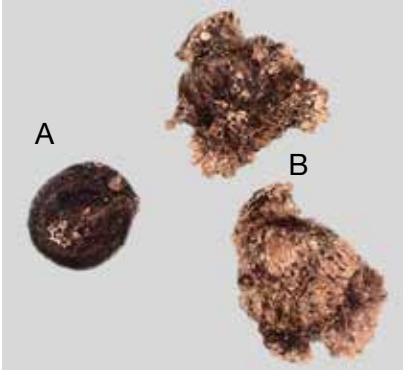
Site Description: Docks grow in a variety of soils and can thrive in disturbed soils, whether sand, loam or clay. These early successional plants are most commonly associated with moist sites including ditches, stream banks, exposed pond and lakebeds, wetlands and low areas of fields and pastures. However, some docks also occur in dry areas including roadsides, disturbed upland forests and areas of cleared timber.

Plant Description: These non-showy flowering plants grow from 1 to 4 feet in height and are recognized by their flowering structures, which have one to three odd-looking teardrop-shaped tubercles. The common curly dock (*Rumex crispus*) has noticeable wavy-margined leaves and large fruiting heads, which turn dark brown-maroon when mature. The preference of docks for disturbed moist sites can also help aid proper identification. The plants are primarily wind pollinated and flower from May through September.

Quail Use: Single plants provide fair cover for quail, but large dock stands can provide excellent growing season cover, especially during the brooding period. Their general affinity for low, moist sites can be especially valuable during periods of drought, attracting important quail insect foods including leafhoppers, caterpillars of some butterflies, grasshoppers, aphids, lady bird beetles and slugs. The seeds are consumed by quail from summer through winter, but don't generally make up a substantial portion of the year-round diet.

Other Considerations: The foliage of the various dock species is occasionally grazed by cattle, but can be toxic if eaten in large quantities. The plants are often strongly associated with surface water wetlands and, because some dock species have allelopathic chemicals, they can deter the establishment of other plants within these areas. While light disking can benefit germination of the seed, deep disking can destroy the stout taproots that many docks produce.

Russian Thistle (*Salsola tragus*)



A: Russian Thistle Seed
B: Russian Thistle with Husk

Actual seed size – A 1/14” ●

Actual husk size – B 1/10” ●

Common Name: Russian Thistle, Tumbleweed

Scientific Name: *Salsola tragus*

Family: Chenopodiaceae, Goosefoot Family

Origin: Introduced

Distribution in Oklahoma: Across the state, but far more common within the western half.

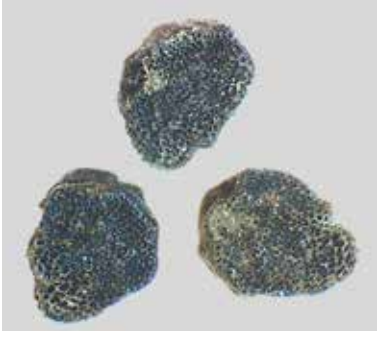
Site Description: Russian thistle is adapted to a variety of soil types, but often occurs in sandy soils. The plants are extremely drought hardy and classic early-successional indicators of disturbed soils, often found is cultivated fields, roadsides, heavily grazed range and pastureland, rights-of-way, gravel lots and waste areas.

Plant Description: The characteristic tumbling of these plants when the main stem breaks off from the roots is often the first sign of their presence. In addition, Russian thistle plants are recognized by their green and purple striped stems, small pine needle-like leaves and bushy growth form. Individual plants can grow from 1 to 4 feet in height, but congregations of "piled-up" tumbleweeds along fence lines and tree rows can be 10 feet tall or more.

Quail Use: Russian thistle branches profusely at ground level and can be very dense at maturity. The plants provide cover for quail, especially when growing in small communities and when forming tumbleweed masses along fences and tree rows. The seeds are readily consumed by quail when available and can be an important food item during the fall and winter months. In addition, many insects are attracted to the foliage and/or flowers including grasshoppers, soft-winged flower beetles, leaf beetles, froghoppers, scentless plant bugs and the caterpillars of some butterfly and moth species.

Other Considerations: Despite its robust and prickly growth habit, cattle will occasionally eat the foliage of young plants. However, Russian thistle has poor forage value and can be toxic to livestock if eaten in high amounts. The plants are prolific seed producers and benefit with nearly any type soil disturbance, especially disking. Russian thistle also establishes following moderate- and high-severity burns and on poorly managed rangeland. Crop fields treated with nitrogen often can have large and abundant stands of Russian thistle, which adds plant diversity for upland game birds, but the plants also create issues for farmers and often are controlled with herbicides. Russian thistle masses can provide important cover along crop field margins for ring-necked pheasant.

Buffalo Burr (*Solanum rostratum*)



Actual seed size – 1/10” ●

Common Name: Buffalo Bur, Texas Thistle, Kansas Thistle, Prickly Nightshade

Scientific Name: *Solanum rostratum*

Family: Solanaceae, Nightshade Family

Origin: Native

Distribution in Oklahoma: Across the state

Site Description: Buffalo bur is an early successional forb that is a classic indicator of highly disturbed barren soil. The plants are adapted to a variety of soils and can be common within disturbed prairies, pastures, agricultural fields, roadsides, clear-cuts, vacant lots, corrals and abandoned fields. They often are found in areas of full sun within dry calcareous soils.

Plant Description: These abundantly prickly forbs grow from 1 to 3 feet tall and are recognized by their crinkled, highly lobed leaves, bright yellow flowers and spine-covered fruits. Nearly every part of this plant is spine-covered, making these weeds easy to identify. Buffalo bur flowers from May through October.

Quail Use: The seeds of buffalo bur are readily eaten by bobwhite and scaled quail, especially from summer through winter. The plants also have some cover value during the growing season, but the stems often break off at ground level during the winter and roll tumbleweed-like across the landscape. Despite the spines, grasshoppers, leaf beetles, flea beetles and potato beetles feed on the foliage and bees visit the flowers.

Other Considerations: Buffalo bur has a very high tolerance to drought and often grows in areas where no other plants can compete. It is very aggressive and can quickly form large populations in disturbed sites. Disking, especially early summer, and clear-cutting benefits the establishment of these plants. However, without continued disturbance, buffalo bur will decrease. In addition to the spines, the plants contain alkaloid chemicals that deter grazing by livestock.

Canada Goldenrod (*Solidago canadensis*)

A: Canada Goldenrod
B: Stiff Goldenrod

Actual seed size – 1/18” •

Common Name: Goldenrod

Scientific Name: *Solidago* spp.

Family: Asteraceae, Sunflower Family

Origin: Native

Distribution in Oklahoma: Across the state.

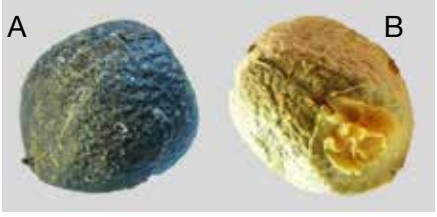
Site Description: Oklahoma's many goldenrod species occur in all stages of plant succession, but most are mid-successional species. They are adapted to a variety of soil types, including rocky or sandy, wet or dry and can occur within prairies, forestlands, stream banks, old fields, pastures, glades, pond and lake margins and roadsides.

Plant Description: Most goldenrod species grow from 1 to 6 feet tall and are recognized by their relatively stout stems and their numerous, small, bright yellow flowers that often occur on arching or recurved flowering branches. Their late flowering habit, from August to October, can also be helpful when identifying these plants.

Quail Use: Because of their stout stems and clonal habit, goldenrods have high value as cover for quail, even during the winter months. Communities of these plants offer excellent brood cover and the plants attract many insects including bees, flies, beetles, aphids, planthoppers, leafhoppers, shield bugs, butterflies, grasshoppers, thrips, spider wasps, gall wasps, leafminers, hoverflies and plant bugs providing food for quail during the summer and early fall. Bobwhite often use patches of goldenrod for feeding, roosting and loafing sites. The green foliage and, to a lesser extent, the tiny seeds are consumed, especially during the winter.

Other Considerations: Goldenrods offer poor forage for cattle and increase within pastures and rangeland, sometimes forming large populations within intensely grazed sites. Fire benefits many goldenrod species. Likewise, some goldenrods are fond of moist soils and readily establish within wetlands and other inundated sites that are drawn down or dry during the spring and summer months.

Queen's Delight (*Stillingia sylvatica*)



A: Queen's Delight
B: Queen's Delight Seed with Husk

Actual seed size – 1/3"

Common Name: Queen's Delight

Scientific Name: *Stillingia sylvatica*

Family: Euphorbiaceae, Spurge Family

Origin: Native

Distribution in Oklahoma: Scattered throughout the state.

Site Description: Queen's delight is characteristic of the mid- to late-stages of plant succession and found within dry, sandy prairies, dunes, old fields and stream margins.

Plant Description: These non-woody, shrub-like plants grow from 1 to 3 feet tall and are recognized by their light green appearance; elongated yellow-tinted flower branches; large, three-lobed fruit pods; and glossy, elliptic-shaped upward-pointed leaves. Growth is slow during the spring, with flowering occurring from June through September.

Quail Use: The large, white to black-colored seeds are consumed by bobwhite when available, but especially during the late summer and fall. Single plants and small communities provide good growing season cover. Grasshoppers, spider wasps, butterflies and leaf beetles are attracted to the foliage and flowers of these unique plants.

Other Considerations: Little information is available on the effect of fire on Queen's delight, but the plants are known to persist with periodic winter burning. The plants also have cyanogenic compounds and are avoided by livestock. Regular disking and mowing will reduce the frequency and coverage of these plants.

Amberique Bean
(*Strophostyles helvola*)

A: Trailing Fuzzybean
B: Slickseed Fuzzybean

Actual seed size – A 3/8”

Actual seed size – B 1/6”

Common Name: Fuzzybean, Trailing Wild Bean, Amberique Bean, Woolly Bean

Scientific Name: *Strophostyles* spp.

Family: Fabaceae, Bean Family

Origin: Native

Distribution in Oklahoma: Across the body of the state.

Site Description: These early to mid-successional legumes grow well in full to partial sun conditions, especially within sandy soils, but loams and clays are tolerated if competition from other species is low. They are found within disturbed prairies, open forests, forest edges, abandoned fields, agricultural fields and field margins, thickets and along streams.

Plant Description: Fuzzybean is an herbaceous twining vine recognized by its trifoliate leaves and its small clusters of pink to purple flowers, which mature into cylindrical, pointed pods that have spiraled brown valves after opening. The shape of the individual leaflets can vary from linear to oval, but can somewhat resemble that of poison ivy. They bloom from July to September.

Quail Use: The seeds of the various fuzzybean species are important quail foods, especially from fall through winter, but year-round if available. These twining vines can form loose mats to provide valuable low-to-the-ground cover, but they also climb on other vegetation to provide aerial cover. However, the cover value of a single plant is much less. Many insects are attracted to the flowers, fruits and foliage. Insects include bumblebees, leaf-cutter bees, dagger bees, ants, leaf beetles, weevils, leafminers and the caterpillars of some butterflies.

Other Considerations: The plants are readily grazed by livestock as well as other herbivores and can be depleted with heavy herbivory. They are preferred by white-tailed deer. They are also very tolerant of drought and generally quick to recover with available moisture. They produce an abundance of root nodules, which aid in adding nitrogen to the soil for other plants to use. Overall, these legumes can be enhanced through light disking and periodic burning, especially dormant-season burns.

Cowpen Daisy (*Verbesina encelioides*)

Cowpen Daisy Seed with Husk

Actual husk size – 3/8”

Common Name: Cowpen Daisy, Golden Crownbeard

Scientific Name: *Verbesina encelioides*

Family: Asteraceae, Sunflower Family

Origin: Native

Distribution in Oklahoma: Primarily encountered within the western two-thirds of the state.

Site Description: Cowpen daisy can occur in varied soil types, but they are most abundant within sandy soils. These early successional species are found within open, disturbed sites including forest edges, prairies, pastures, abandoned fields, corrals and roadsides. It is highly drought tolerant.

Plant Description: These multi-branched plants grow 1 to 3 feet in height and are recognized by their silvery-green foliage; their toothed, nearly triangular-shaped leaves; and large, bright yellow flowers with prominently three-lobed petals. Cowpen daisy blooms from June to October.

Quail Use: Dense populations of these forbs provide valuable year-round cover for quail as the stems and dried leaves often persist well into the winter and spring. Many butterflies and moths are attracted to the flowers, but the plants also attract mining bees, sweat bees, spider wasps, jewel beetles, thick-headed flies, mealybugs and aphids. The seeds, including the winged husks, are consumed by both bobwhite and scaled quail, especially during the fall and winter.

Other Considerations: Cowpen daisy contains toxic nitrates that deter grazing by cattle and they can be quite common within grazed areas and cow pens. The plants favor any type of soil disturbance, especially disking. In addition, they withstand winter burning, sometimes increasing in frequency and occurrence after fire. This plant has an incredibly long blooming period and produces copious seeds. It also is highly attractive to small native bees throughout the summer and early fall.

Woody Plants

Sand Sagebrush (*Artemisia filifolia*)

Actual seed size – 1/24” •

Common Name: Sand Sagebrush

Scientific Name: *Artemisia filifolia*

Family: Asteraceae, Sunflower Family

Origin: Native

Distribution in Oklahoma: Found in the western third of the state.

Site Description: Sand sagebrush grows on sandy soils including deep, loose sands and dunes. These late-successional species are well adapted to soils of low fertility.

Plant Description: This multi-branched woody shrub grows from 3 to 4 feet tall and is recognized by its silver-blue to gray foliage and pungent "cough-medicine" fragrance when the stems and leaves are crushed. They bloom from July to October.

Quail Use: The woody, multi-branched growth of sand sagebrush provides important cover for bobwhite (primarily during the winter) and for scaled quail (year-around). Insects that are attracted to these shrubs include grasshoppers, leaf beetles, aphids, scales, broad-headed bugs and several butterfly species. Although the seeds are tiny, scaled quail are known to consume them during the fall and winter months.

Other Considerations: Sand sagebrush is of poor forage value to livestock. They re-sprout profusely after burning, but shrub height, canopy and volume is generally reduced for two to three seasons after a fire, which allows other beneficial food and cover plants to establish. Frequent mowing limits the production of these species. Sand sagebrush is excellent at holding deep sandy soils in place due to its extensive root system.

Netleaf Hackberry (*Celtis reticulata*)

A: Netleaf Hackberry
B: Sugarberry Fruit

Actual seed size – A 1/4”

Actual fruit size – B 1/3”

Common Name: Hackberry, Sugarberry

Scientific Name: *Celtis* spp.

Family: Ulmaceae, Elm Family

Origin: Native

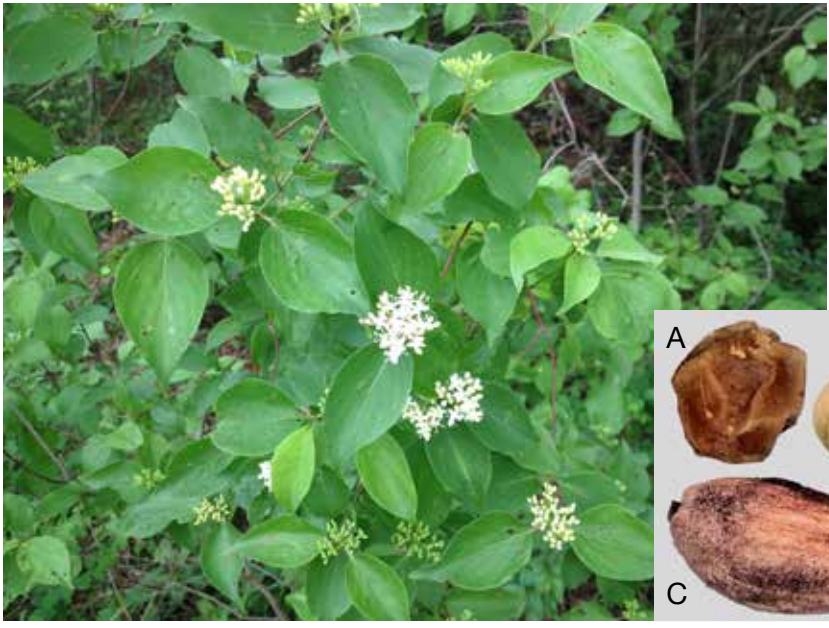
Distribution in Oklahoma: Across the state, depending on species.

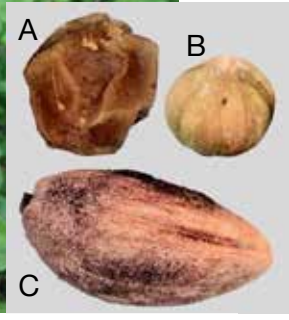
Site Description: These mid- to late-successional species are adapted to a variety of soils and conditions, but will be much smaller in stature on poor soils or with less rainfall. They prefer full or partial sun in moist to slightly dry, rich soils. They occur within floodplain forests, upland forests, forest edges, along streams, savannas, wooded fencerows and prairies.

Plant Description: These medium- to large-sized trees grow from 30 to 80 feet tall and are recognized by their corky-ridged, warty bark and round, purple-brown to orange-red berries, which can persist on twigs into the winter. They bloom from April to June.

Quail Use: Bobwhite and scaled quail consume the berries and seeds year-round, if available. These can be important dietary items from late summer through winter. Hackberries provide important year-round cover, but the cover provided by lower-stature trees is more widely used than tall, mature trees. Occasionally, bobwhite nest under the canopy of low-growing hackberry trees. Many insects use these trees including scales, jumping plant lice, wood-boring beetles, jewel beetles, longhorn beetles, plant bugs, mites, grasshoppers, lace bugs and the caterpillars of many butterflies and moths.

Other Considerations: Hackberry is of poor grazing value to livestock and tends to increase on rangelands that lack fire. Their relatively thin bark makes them susceptible to fire, especially frequent burning. While they often occur within low, floodplain forests, they do not readily establish in areas with a high water table and the seedlings are intolerant of extended periods of flooding. Most hackberry species are intolerant of heavy shade. Hackberry is a preferred deer forage and young plants can be suppressed in areas with high deer densities.





A: Roughleaf Dogwood Fruit
B: Roughleaf Dogwood
C: Flowering Dogwood

Top: Flowering Dogwood (*Cornus florida)*
Bottom: Rough-leaved Dogwood (*Cornus drummondii*)

Actual fruit size – A 1/4”

Actual seed size – B 1/5”

Actual seed size – C 3/8”

Common Name: Dogwood

Scientific Name: *Cornus* spp.

Family: Cornaceae, Dogwood Family

Origin: Native

Distribution in Oklahoma: Across the state and into the panhandle.

Site Description: Dogwoods can occur within loam, sand or clay soils and some thrive in sites subject to occasional disturbance. These early to mid-successional species occur along stream banks, ditches, prairies, open forests, forest edges, savannas, wooded fencerows and forested floodplains. Flowering dogwood readily grows in partial shade, while roughleaf dogwood prefers open, sunny sites.

Plant Description: Dogwoods can grow as 2- to 8-foot tall shrubs or low growing trees up to 30 feet tall or more, depending on the species. The shrubby species are recognized by their thicket-forming habit and their flat-topped white flowering branches, which mature into white or blue berries. Flowering dogwood is recognized by its short tree form, its large white flowers, and its tight cluster of bright red berries. Dogwoods have oppositely arranged leaves which, when gently torn apart, have distinctive cotton-like strands that connect the two leaf halves. They bloom from April to June.

Quail Use: These thicket-forming dogwoods provide year-round cover, but their value is much higher during the growing season. The berries and seeds are consumed by bobwhite from late summer into the winter, and the plants attract a variety of insects including aphids, fruit flies, flea beetles, stink bugs, thrips, longhorn beetles, grasshoppers, spittlebugs, midges and many butterflies and moths.

Other Considerations: Most dogwoods are browsed by cattle, but only under heavy grazing pressure when more desirable forage is in short supply. Flowering dogwood has thin bark and is sensitive to fire, especially fires of moderate to high intensity. Roughleaf dogwood is more tolerant of fire and will root sprout even if the aboveground portions are killed. Fruiting production of dogwoods can be enhanced when heavily wooded areas are thinned, allowing more sunlight to penetrate the canopy.

Green Ash (*Fraxinus pennsylvanica*)

Actual seed size – 2/3”

Common Name: Ash

Scientific Name: *Fraxinus* spp.

Family: Oleaceae, Olive Family

Origin: Native

Distribution in Oklahoma: Across the state, but more common in the eastern half.

Site Description: Ash trees are early to mid-successional species that are adapted to a variety of soils and can grow in dry upland or moist lowland sites. Green ash is typically found in wet lowland areas in Oklahoma. Clay-loam and silt-loam soils are often preferred. They can occur within forested floodplains, ditches, stream banks, waterways, fencerows and other wooded sites.

Plant Description: Ash trees can grow more than 100 feet tall and are recognized by their oppositely arranged twigs (easily recognized during the winter) and leaves, deeply furrowed bark and clusters of winged samaras (seeds). They bloom during March and April with samaras persisting on the trees through the fall.

Quail Use: Young, shrubby ash trees are more valuable as cover for quail than older, taller trees, especially during the growing season. The elongated yellow-orange seeds are stripped from the winged outer covering and eaten year-round, but are most available during late summer and early fall. Many insects are attracted to the trees and may provide additional feeding opportunities for quail including leaf beetles, sawflies, plant bugs, stink bugs, aphids, scales, gall flies, flea beetles, ash borers and several butterflies and moths.

Other Considerations: Ash trees are vulnerable to fire, especially high-intensity fires. Burning when the trees are dormant reduces the risk of fire kill. Overall, cover and frequency of ash species is much less within areas that are burned regularly. The foliage is palatable to cattle, but they rarely consume enough foliage to alter the usefulness of these plants for quail. Cut trees can re-sprout, but ash species primarily reproduce by seed.

Prickly Pear (*Opuntia macrorhiza*)

Actual seed size – 1/4”

Common Name: Prickly Pear

Scientific Name: *Opuntia* spp.

Family: Cactaceae, Cactus Family

Origin: Native

Distribution in Oklahoma: Across the state, but more common within western third.

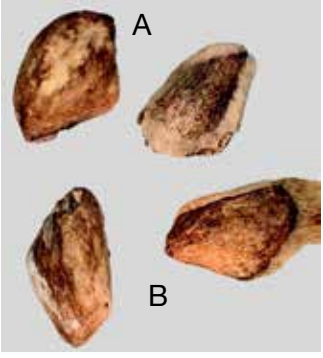
Site Description: Prickly pear can occur within a variety of soil types, but does particularly well within well-drained sandy or rocky soils. These mid to late-successional species occur within prairies, open forests and forest edges.

Plant Description: These easily recognized cacti can grow from 6 inches to more than 3 feet tall and can be more than 3 feet across. They have spine-covered, bluish-green, flattened pads; large yellow, pink or red flowers; and red ripened fruits. The plants also have short, stout barbs that easily pierce the skin. Prickly pear blooms from May to July with fruits ripening from late summer into the fall.

Quail Use: Prickly pear offer considerable year-round protective cover for bobwhite and scaled quail. Quail nests have been documented under prickly pear. They can be especially important for cover during drought years or in heavily grazed pastures. Numerous insects use the plants including longhorn beetles, jewel beetles, soft-winged flower beetles, aphids, stink bugs, flies, assassin bugs, scales, bees and the larvae of several moths. The fruits and seeds are also consumed by quail during the fall and winter months, providing both food and moisture. Quail often will be found with purple bibs stained from prickly pear fruit during the fall.

Other Considerations: Prickly pear is generally avoided by cattle, except when fire has removed the thorns. The plants increase in abundance within heavily grazed range. In addition, because of its extreme tolerance and adaptations to drought, plains prickly pear usually increases during long drought periods as other plants decrease. High-intensity fires usually kill the aboveground portions of these cacti, but the plants will re-sprout, especially after fires of low to moderate intensity. The pads, if fragmented by disturbance, can produce adventitious roots and establish new plants.

Shortleaf Pine (*Pinus echinata*)



A: Shortleaf Pine
B: Loblolly Pine

Actual seed size – 1/5”

Common Name: Pine, Loblolly Pine, Shortleaf Pine

Scientific Name: *Pinus taeda* (Loblolly) and *Pinus echinata* (Shortleaf)

Family: Pinaceae, Pine Family

Origin: Native

Distribution in Oklahoma: Shortleaf pine is found in the eastern third of the state, loblolly pine is found in southeastern Oklahoma.

Site Description: These mid- to late-successional species grow on dry, rocky, acid-based sandy or loamy soils, but are adaptable to other sites. They occur within upland (shortleaf) and lowland (loblolly) forests, forest edges, relatively unmaintained roadsides, savannas and old fields.

Plant Description: Loblolly and shortleaf pine grow from 50 to 100 feet tall and are recognized by their evergreen needles, scaly bark and egg-shaped brown cones. Shortleaf pine has a pyramid-shaped crown, while loblolly pine has a more rounded crown. They bloom from February to May with opened cones remaining on the trees through the winter.

Quail Use: Pine trees provide limited cover for bobwhite, mainly when the trees are young. The seeds are readily consumed by bobwhite and can be a very important year-round dietary component, including very high use from fall through winter. Pine trees attract scales, thrips, leaf beetles, pine beetles, bees, sawflies, planthoppers, aphids, weevils, midges and many butterflies and moths.

Other Considerations: Pine trees, especially shortleaf, generally do not bear seeds until 20 years of age, but are prolific seed producers afterwards. Pines will voluntarily establish within suitable sites quite easily, especially within cleared areas that have been recently burned or disturbed by logging or tractor activities. Young pine trees can be killed by fire (especially loblolly) and burning should be avoided until the trees are 10 to 15 years of age to avoid mortality. Once mature, they are fire tolerant and fire is needed to maintain an open understory for bobwhite within pine forests. Overall, shortleaf pine is drought tolerant, slow growing and very hardy, while loblolly grows much faster and responds well to fertile soils and ample moisture.

Honey Mesquite
(*Prosopis glandulosa*)

Actual seed size – 1/5”

Common Name: Honey Mesquite, Mesquite

Scientific Name: *Prosopis glandulosa*

Family: Mimosaceae, Mimosa Family

Origin: Native

Distribution in Oklahoma: Found in the western third of the state, but most common in southwestern Oklahoma.

Site Description: Honey mesquite is adapted to a wide variety of sites and soil types including dry, sandy or gravelly soils as well as clays. However, they seem to grow best within medium to fine-textured soils. These mid- to late-successional plants are found in prairies and deserts, but also along the margins of streams and floodplains of larger water bodies.

Plant Description: These shrubs or small trees can grow to 30 feet tall and are recognized by their yellow-green appearance, abundance of linear- to oblong-shaped leaflets and their elongated seed pods, which are constricted between each seed. They bloom from May to June and the seed pods ripen during late summer.

Quail Use: The low, shrubby growth of mesquite provides year-round cover for quail, especially when the low-hanging branches are at ground level. The seeds can be a seasonally important food for bobwhite and scaled quail, especially during the fall and winter when they are primarily available. The foliage and other parts of these shrubs, including the shade they provide, attracts grasshoppers, spider wasps, aphids, longhorn beetles, scales, bees, jewel beetles, ants and gall wasps.

Other Considerations: In the absence of fire, mesquite can increase to the point of shading out the understory vegetation. Fire was an important tool to control the spread of these shrubs across the landscape, and periodic fire is still a valuable practice as it top-kills aboveground portions and promotes root sprouting to maintain them in a low, shrubby form for quail. Mechanical control only works if the dormant buds, which occur along the underground stem, are damaged or removed. Chemical control can be used to selectively thin dense stands of mesquite and increase the grass and forbs needed for quail. Mesquite is largely an emergency food for livestock, but they do consume the twigs, leaves and beans. Overall, mesquite benefits from grazing as livestock spread the undigested seeds across wide areas.

Top: Sand Plum (*Prunus angustifolia*)
Bottom: Oklahoma Plum (*Prunus gracilis*)

A: Sand Plum Stone
B: Sand Plum Seed

Actual stone size – A 5/8”

Actual seed size – B 1/3”

Common Name: Plum, Sand Plum, Chickasaw Plum, Oklahoma Plum

Scientific Name: *Prunus angustifolia* (Sand Plum) and *Prunus gracilis* (Oklahoma Plum)

Family: Rosaceae, Rosaceae Family

Origin: Native

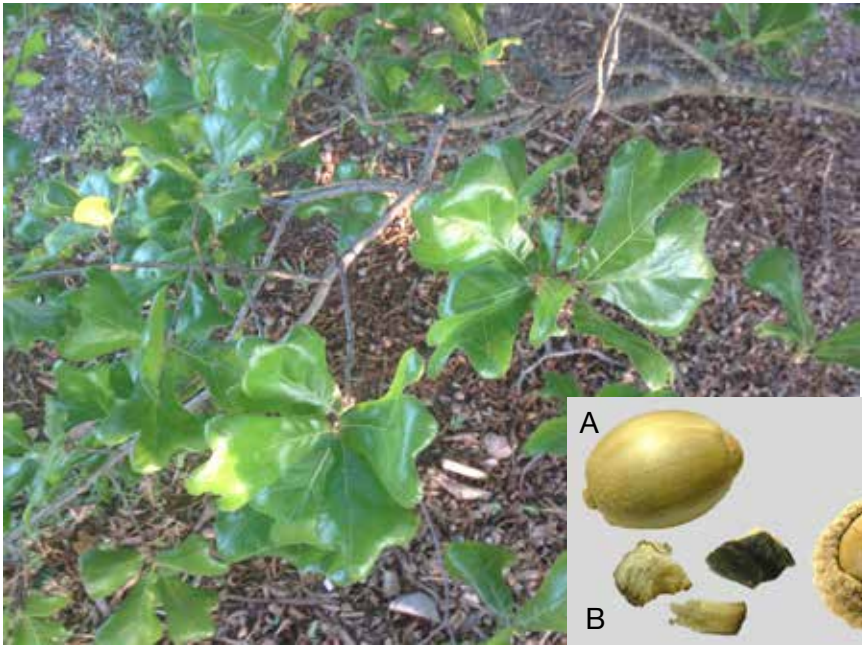
Distribution in Oklahoma: Across the state, depending on species.

Site Description: These mid- to late-successional species grow best on dry, sandy soils and occur within prairies, pastures, open forests, forest edges and openings, wooded fencerows and unmaintained roadsides. Growth and production are best in full sun, but the plants will tolerate some shade.

Plant Description: These shrubs grow from 2 to 10 feet tall and are recognized by their thicket-forming habit, their red-brown twigs and leaf stalks and their bright red ripened fruits. They bloom from March to April and the ripe fruits rarely persist on the stems past late summer.

Quail Use: There are several species of plum native to Oklahoma, but sand plum and Oklahoma plum are the most widespread and valuable. Thickets of these shrubby species provide very important year-round cover for bobwhite and scaled quail, often serving as focal points within a covey's range. The fruit pulp and large seeds are consumed by quail, primarily during the summer. The insect value of these shrubs provides additional food resources. Insects include shore flies, thick-headed flies, plant bugs, bees, leafhoppers, soft-winged flower beetles, leaf beetles, leafminers, hoverflies, fruit flies, sawflies, aphids, butterflies and moths.

Other Considerations: Plums are largely undesirable for cattle, though they will occasionally consume the fruits. Although plums will root or stump sprout after fire, the aboveground portions can be top-killed and lose cover value until they fully recover, which can take several years. As a result, small, scattered stands of plums in areas with limited shrub cover, should be protected from fire until well established or additional thickets begin to grow. However, older plum thickets with patches of dead stems, especially toward the center, can be rejuvenated with fire. Plums growing in shaded areas rarely form the dense thickets which quail prefer, so thinning the overstory trees can help plums grow and expand. Bare-root seedlings are available commercially and provide a relatively easy way to establish plums for quail and other wildlife.



Top: Post Oak (*Quercus stellata*)
Bottom: Blackjack Oak (*Quercus marilandica*)

A: Oak Seed
B: Oak Seed Fragments
C: Oak Seed with Cap

Actual seed size – 5/8”

Common Name: Oak

Scientific Name: *Quercus* spp.

Family: Fagaceae, Beech Family

Origin: Native

Distribution in Oklahoma: Across the state, depending on species.

Site Description: Oaks occur on a wide variety of soils, including poorly drained clay soils of bottomlands to dry, sandy or rocky upland sites. They are largely a late-successional species and are found within upland and lowland forests, woody fencerows, savannas, old homesteads and scattered within prairies.

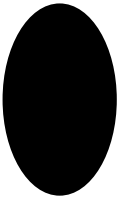
Plant Description: Oklahoma's many oak species can grow from 3 feet to more than 100 feet tall and are primarily recognized by the presence of acorns. The leaves of oaks can vary from finger-shaped to wavy-margined to deeply lobed. Species within the red/black oak group have bristle-tipped leaves, while species from the white oak group do not. They bloom during March and April, with mature acorns falling during the late summer and early fall months.

Quail Use: Oak acorns are a highly desired wildlife food. Bobwhite readily consume acorns when available, especially during the fall and winter. While acorns are a valuable food resource, they are consumed sporadically and seasonally for quail. While smaller acorns can be swallowed whole, acorn pieces are most often observed within quail crops. Oaks also provide important year-round cover, especially when growing in shrub-like form. Many insects are attracted to these valuable species including scales, jewel beetles, aphids, longhorn beetles, tumbling flower beetles, bees, gall wasps, weevils, thrips, mites, grasshoppers and caterpillars of many butterflies and moths.

Other Considerations: Although moderately tolerant of shade, young oaks need full sunlight to outgrow their competitors and oak regeneration can be low within dense forest overstories. Oaks will root or stump sprout after fire, but frequent fire can prevent young trees from establishing. However, the absence of fire can allow dense forests to establish and eliminate important herbaceous ground cover for quail. Two of the more common oak species – post oak and blackjack oak – grow very slowly, but provide valuable shrub-like growth for quail when they root or stump sprout.

Shinnery Oak (*Quercus havardii*)

Actual seed size – 1”



Common Name: Shinnery Oak, Havard Oak, Sand Shinnery Oak

Scientific Name: *Quercus havardii*

Family: Fagaceae, Beech Family

Origin: Native

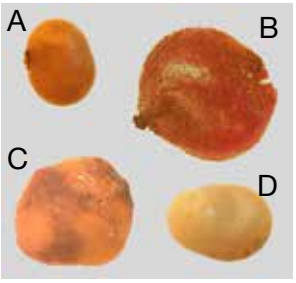
Distribution in Oklahoma: Western quarter of the state, but largely absent from the panhandle.

Site Description: Shinnery oak is a late-successional species that primarily occurs in deep sandy soils.

Plant Description: These shrub-sized oaks grow from 1 to 5 feet in height, but the plants occasionally hybridize with post oak to reach much taller heights. Shinnery oak is recognized by its shrubby growth, its shallowly lobed leaves and its large acorns with caps that may cover half the total acorn length. They bloom from April to May and acorns mature from August to September.

Quail Use: Shinnery oak provides important year-round cover for quail and the hybrid motte stands are readily used during hot summer days. The acorns, whole or in pieces, are readily consumed by bobwhite and scaled quail when available. The catkins are also consumed during the early summer. Longhorn beetles, stink bugs, jewel beetles and aphids have been noted to visit these shrubs.

Other Considerations: The leaves and acorns of shinnery oak are generally not consumed by livestock due to the presence of tannins. Fire will usually top-kill this oak, but the plants have an incredible root system and will readily root sprout, achieving pre-burn form within two to three years. Without fire, these shrubs can produce dense thatch, so periodic burning is important for maintaining a good forb component. Deep plowing can kill shinnery over time. Because of its value for many wildlife species and that the extensive roots stabilize loose sandy dunes, eradicating shinnery oak stands is discouraged.



A: Winged Sumac
B. Fragrant Sumac Fruit
C: Fragrant Sumac
D: Smooth Sumac

Top: Winged Sumac (*Rhus copallinum*)
Bottom: Smooth Sumac (*Rhus glabra*)

Actual seed size – A 1/7”
Actual fruit size – B 1/4”
Actual seed size – C 1/5”
Actual seed size – D 1/6”

Common Name: Sumac

Scientific Name: *Rhus* spp.

Family: Anacardiaceae, Cashew Family

Origin: Native

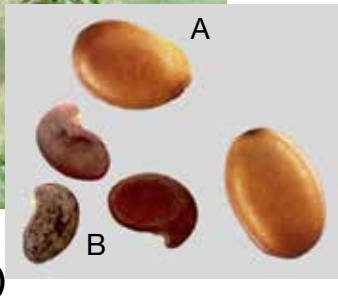
Distribution in Oklahoma: Across the state, depending on species

Site Description: These mid- to late-successional species occur within a variety of soil types and moisture conditions, with some well adapted to sandy soils and others to rocky, clay to loam soils. They occur within prairies, open forests, forest edges and fencerows.

Plant Description: These 1- to 10-foot tall woody shrubs are recognized by their thicket-forming habit and their clusters of bright red to maroon hairy berries, which often persist into the winter. They bloom from April to June.

Quail Use: Sumacs provide extremely important woody cover for quail, especially during the heat of summer. Often, coveys use these shrub thickets as headquarters and rarely drift far from thickets when feeding. The berries/seeds are readily consumed by bobwhite and scaled quail, especially during the fall and winter months. Still, the berries and seeds can be important dietary items from winter through spring. Their low, woody growth gives quail access to many insects that use the plants including aphids, grasshoppers, soft-winged flower beetles, jewel beetles, longhorn beetles, leafhoppers, froghoppers, plant bugs, bees, flies, bee flies, soldier flies, thick-headed flies, flea beetles and many butterflies and moths.

Other Considerations: Sumacs are grazed by livestock, but the foliage is of low quality and the plants can increase on grazed range. The plants benefit from periodic fire, as they sprout vigorously after burning. Sumac often increases after high-intensity fire such as eastern redcedar crown fires. In some cases, sumac can become abundant enough as to limit food resources for quail, but in general it is a desirable plant. Annual mowing or burning sumac thickets reduces the value of this cover for quail and should be avoided, especially if sumac stands are the only shrub-like cover available.



Top: Black Locust (*Robinia pseudoacacia*)
Bottom: Honey Locust (*Gleditsia triacanthos*)

A: Honey Locust
B: Black Locust

Actual seed size – A 1/2”

Actual seed size – B 1/5”

Common Name: Black Locust, Honey Locust, Locust

Scientific Name: *Robinia pseudoacacia* and *Gleditsia triacanthos*

Family: Fabaceae, Bean Family and Caesalpiniaceae, Caesalpinia Family

Origin: Native

Distribution in Oklahoma: Across the state.

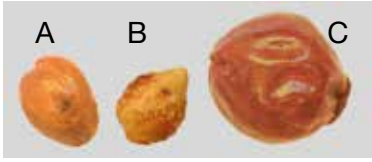
Site Description: Locust can occur on a variety of sand, clay and loam soil types, as well as areas that are dry to slightly moist. The plants prefer full sun conditions and occur within upland forests, well-drained forest bottomlands, old homesteads, abandoned fields, pastures and wooded fencerows. These early to mid-successional species are much more common within secondary growth forests.

Plant Description: These woody species can grow more than 80 feet tall, but usually occur as much shorter trees. They are recognized by their abundant oval-shaped leaflets. Honey locust has stout, branched thorns and long, brown, twisted seedpods. Black locust has paired spines at the base of leaf branches and shorter, flatter pods. Both trees bloom from May to June.

Quail Use: Dense, small thickets of locust offer valuable woody cover for quail, especially when growing in a more shrub-like form. Large, dense stands can completely shade out the understory and prevent any use by quail except along the edges. Their overall winter cover value is much less. The seeds are consumed by quail year-round, if available, but especially during the fall and winter. Many insects are attracted to the flowers and/or foliage including honeybees, bumblebees, jewel beetles, sawflies, treehoppers, froghoppers, aphids, leafminers, plant bugs, gall flies and caterpillars of some butterflies and moths.

Other Considerations: These trees grow rapidly, but are relatively short-lived. Their ability to root sprout and tolerate poor soils can make them useful for some land reclamation projects. However, they can be very aggressive and invade open prairies. Without frequent fire, they will convert prairies into woodland and decrease quail use. Smaller trees are easily top-killed by fire, but the trees are quick to take over open space by root-sprouting. In addition, fire scarifies the seed and promotes the germination of new trees. Overall, because of their ability to root sprout and produce seed in as little as six years, locust can spread rapidly. Once established, herbicide is necessary to kill the trees if they become too abundant. Smaller trees can be sprayed with a foliar herbicide. Larger trees will require either hack-and-squirt or cut stump treatments with various herbicides labeled for these uses.

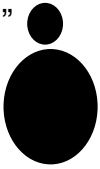
Top: Carolina Rose (*Rosa carolina*)
Bottom: Multiflora Rose (*Rosa multiflora*)



A: Prairie Rose
B: Multiflora Rose
C: Carolina Rose Fruit

Actual seed size – A, B 1/5”

Actual fruit size – C 2/3”



Common Name: Rose

Scientific Name: *Rosa* spp.

Family: Rosaceae, Rose Family

Origin: Native and introduced.

Distribution in Oklahoma: Across the state.

Site Description: Wild roses can grow in sand, loam or clay soils, but some prefer moist, fertile ground. They are characteristic of the mid to late stages of plant succession and occur within prairies, pastures, open forests, forest edges, forest clearings and roadsides.

Plant Description: These 1- to 15-foot long climbing or trailing vine-like shrubs are recognized by their five-petaled, white to pink flowers; ripened red hips (fruits); and prickly stems. They bloom from May to July and the hips can remain on the stems well into winter.

Quail Use: The hips and seeds of the various wild roses are consumed to a limited extent year-round, but rarely make up a large portion of the diet. The dense thickets of rose provide year-round cover. Bees, flies, weevils, spider mites, jewel beetles, soft-winged flower beetles, hoverflies, gall wasps, leafhoppers, bee flies, fruit flies, sawflies, thrips, butterflies and moths all visit the plants and provide additional food resources for quail.

Other Considerations: Wild roses, in general, offer poor forage value to livestock and may increase as a result of intense grazing. The growth and production of these species is best in full sun, but some tolerate lightly shaded sites. Wild roses can survive periodic fire, especially low- to moderate-severity burns, but annual growing season burns can reduce the cover and frequency of some wild rose species. Oklahoma's non-native rose, multiflora rose (*Rosa multiflora*), can grow aggressively and out-compete native plants for space and should be controlled. Control of this species, however, has proven difficult because seeds remain viable in the soil for many years and are quick to establish when conditions are optimum.

Blackberry (*Rubus* sp.)

(Not identified to individual species)

Actual seed size – 1/8”

Common Name: Blackberry, Raspberry, Dewberry

Scientific Name: *Rubus* spp.

Family: Rosaceae, Rose Family

Origin: Most are native. One introduced species is present.

Distribution in Oklahoma: Across the state.

Site Description: Blackberries grow in a variety of soil types, including sandy and rocky, but growth is best in rich, fertile soils. These early to mid-successional species grow in full sun or light shade and can tolerate dry conditions. They are found within open forests, forest edges, abandoned fields, fencerows, prairies, stream bottoms, pastures and roadsides.

Plant Description: These shrub-like plants can grow from 6 inches to more than 5 feet tall and are recognized by their thorny to prickly, often abundant stems; serrated, usually trifoliate leaves; and white flowers, which mature into red, and eventually, black fruits. Some blackberry species grow entirely along the ground, while others grow upright or have arching stems. Blackberry blooms from April to June.

Quail Use: Blackberry brambles have excellent year-round cover value and the plants are frequently used for bobwhite winter feeding and loafing sites. The fruits are readily consumed by quail during the summer and the seeds are consumed year-round. These important nectar-producing plants attract many insects including honeybees, bumblebees, mason bees, leaf-cutting bees, plant bugs, grasshoppers, wood-boring beetles, hoverflies, longhorn beetles, sawflies, gall wasps, leafhoppers, flea beetles and many butterflies and moths.

Other Considerations: Despite the prickles, the stems and leaves are browsed by cattle, white-tailed deer and eastern cottontail. Forest thinning benefits the growth and establishment of blackberry, and fruit production can be substantially enhanced when dense timber stands are clear-cut or aggressively thinned. Nearly all blackberries benefit from periodic fire, and the cover and frequency of these important shrub-like plants is usually much reduced within fire-suppressed areas. Fruit is only produced on older stems (canes). Not only is blackberry an important quail plant, it provides excellent cover for many species of wildlife including both game and non-game animals. While blackberry can become a dominant plant and require limited herbicide control, this shrub is one of the best overall wildlife plants in Oklahoma.

Elderberry (*Sambucus canadensis*)

Actual seed size – 1/10”

Common Name: Elderberry, American Black Elderberry, Sweet Elder, Elder

Scientific Name: *Sambucus canadensis*

Family: Caprifoliaceae, Honeysuckle Family

Origin: Native

Distribution in Oklahoma: Eastern four-fifths of the state.

Site Description: Elderberry is an early successional species that prefers moist conditions and fertile loamy soils. They can grow in full sun or light shade and often are found at the edges of streams, seeps, ponds and ditches and within moist, open, lowland forests.

Plant Description: These multi-stemmed shrubs grow from 4 to 12 feet tall and are recognized by their large, usually drooping compound leaves and their wide, dome-shaped white flowering inflorescences that eventually mature into a wide cluster of purple-black berries. Their common occurrence within low, moist sites can also aid in identification. Elderberry plants bloom during May and June.

Quail Use: Thickets of these shrubs provide growing season cover, but the value diminishes during the late fall and winter after the leaves fall. The fruits provide food for quail from late summer into the winter, when they are most abundant. Elderberry attracts an abundance of insects particularly when blooming. Insects attracted include bees, bee flies, leaf beetles, tumbling flower beetles, aphids, slugs, thrips and plant bugs.

Other Considerations: The foliage of elderberry is reportedly bitter, but grazed by livestock to some extent. The plants are fast growers and produce clonal offsets, which can often line the banks of streams and ditches. Elderberry decreases with some disturbance, especially regular mowing, and is sensitive to frequent fire. These shrubs are easily grown from stem cuttings, especially when cuttings are from juvenile plants.

Chittamwood
(*Sideroxylon lanuginosum*)

Actual seed size – 1/3”

Common Name: Chittamwood, Gum Bully, Woolly Buckthorn, Gum Bumelia

Scientific Name: *Sideroxylon lanuginosum*

Family: Sapotaceae, Sapodilla Family

Origin: Native

Distribution in Oklahoma: Scattered across the body of the state.

Site Description: Chittamwood can grow in dry or moist, well-drained soils including areas of full sun or partial shade. They are characteristic of the mid- to late-stages of plant succession and occur within open upland or lowland forests, forest edges, glades and along streams. Plants growing on thin, dry, rocky soils, usually occur as solitary trees, but chittamwood can form small stands within sandy areas.

Plant Description: These multi-trunked shrubs to medium-sized trees can exceed 50 feet in height and are recognized by their oblong spoon-shaped leaves, sharp thorns and shiny black fruits. The underside of each leaf is often white and fuzzy. Chittamwood blooms from May to July and the fruits ripen in late summer.

Quail Use: The large shrub and low-growing tree form of this species provides year-round cover for quail, and small stands can be especially attractive. The large seeds are consumed by bobwhite from late summer through winter and the plants attract a number of insects, including bees, treehoppers, scales, leaf beetles, aphids, grasshoppers and moths.

Other Considerations: The foliage of chittamwood is grazed by cattle to some extent and the plants are quite tolerant of heat and drought conditions. The plants often remain stunted within rocky, dry or poor soils, which can limit fruit production, but also benefit quail by providing low woody cover. Trees that are left unpruned will better maintain their low, shrub-like growth for quail.

A: Saw Greenbrier
B: Smooth Carrionflower
C: Roundleaf Greenbrier

Top: Saw Greenbrier (*Smilax bona-nox*)
Bottom: Fruit of Greenbrier

Actual seed size – A 1/6”
Actual seed size – B 1/4”
Actual seed size – C 1/5”

Common Name: Greenbrier, Saw Greenbrier, Carrionflower

Scientific Name: *Smilax* spp.

Family: Smilacaceae, Greenbrier Family

Origin: Native

Distribution in Oklahoma: Across the body of the state.

Site Description: Greenbrier species flourish within a variety of soil types including rocky or sandy loams or clays. They are characteristic of the early to mid-stages of plant succession and are found within open and closed forests, forest edges, savannas, prairies, thickets, old fields, fencerows and rights-of-way. They do best with some sunlight.

Plant Description: These woody-like vines can grow 20 feet or more in length and are recognized by their green, bristly to prickly, tough stems and rounded clusters of black berries. Most species have spines or prickles, but some are spineless. They bloom from March to June and berries can remain on the stems through the winter.

Quail Use: Greenbrier vines can form dense, nearly impenetrable thickets that provide cover for many species of wildlife, including quail. The berries and seeds provide year-round food for quail, but do not make up a substantial portion of the diet. Insects including bees, aphids, flies, leaf beetles, flea beetles, thrips, grasshoppers, flesh flies, gall wasps and moths use various portions of the plants.

Other Considerations: Greenbriers have a high tolerance to heat and drought and will sprout from the roots when top-killed by fire. The young vegetative growth is high in protein and is an important winter browse for white-tailed deer. Cattle will also consume it. Thinning closed-canopy forests and creating forest openings can vastly increase the amount of greenbrier and fruit production.

Soapweed Yucca (*Yucca glauca*)

Actual seed size – 1/4”

Common Name: Soapweed Yucca, Soap-plant, Plains Yucca

Scientific Name: *Yucca glauca*

Family: Agavaceae, Century-plant Family

Origin: Native

Distribution in Oklahoma: Across the state, but most common in the western third.

Site Description: These mid-successional species grow on a variety of soils, but do especially well in sunny, sandy or rocky, well-drained sites. They can be found within dry prairies, open forests, forest edges, pastures and relatively unmaintained roadsides.

Plant Description: These hardy evergreen shrubs grow to approximately 3 feet in height, but the flowering stalks can exceed 5 feet. They are recognized by their 3- to 4-foot wide clump of sword-shaped leaves; tall flowering stalks of cream-colored, drooping flowers; and large brown capsules, which often persist well into winter. Soapweed yucca blooms from June to August.

Quail Use: The shrubby, evergreen growth of soapweed yucca provides year-round cover for quail, including roost site and nesting cover, especially for scaled quail. The black, flat seeds are consumed when available, but do not make up a large portion of the year-round diet. Moths, butterflies, longhorn beetles, aphids, thrips and shield-back katydids utilize various portions of the plants.

Other Considerations: Soapweed yucca is of poor grazing value for cattle and increases within grazed rangelands. The plants are susceptible to high-severity fires, but will re-sprout from periodic low- to moderate-severity burns. Seeds exposed to very hot temperatures have much lower germination rates, but new plants can be established from root cuttings. Yucca can provide cover for quail during drought conditions or in heavily grazed pastures when little else remains.

Appendix A. Insects Found in the Diet of Northern Bobwhite and/or Scaled Quail.

Insect Name	*Classification*[1]
Ant Lions	Myrmeliontidae
Ants[2]	**Formicidae**
Aphids	Aphididae
Aquatic Backswimmers	Notonectidae
Beetles (in general)	**Coleoptera**
Burrowing Bugs	Cydnidae
Butterflies/Moths	**Lepidoptera**
Centipedes	Chilopoda
Chalcid Wasps	Chalcidoidea
Chewing Lice/Biting Lice	Mallophaga
Chinch Bugs	Blissidae
Cicadas	Cicadidae
Click Beetles/Spring Beetles	Elateridae
Crickets	Gryllidae
Damsel Bugs	Nabidae
Darkling Beetles	Tenebrionidae
Flesh Flies	Sarcophagidae
Flies	Muscidae
Froghoppers/Spittle Bugs	Cercopidae
Gnats	Sciaroidea
Grasshoppers	**Caelifera**
Ground Beetles	Carabidae
Ground Pearls	Margarodidae
Harvestmen Spiders	Opiliones
Ichneumon Wasps/Scorpion Wasps	Ichneumonidae
Jewel Bugs/Metallic Shield Bugs	Scutelleridae
Katydids/Bush Crickets	Tettigoniidae
Lady Bird Beetles	Coccinellidae
Leaf Beetles	Chrysomelidae
Leafhoppers	Cicadellidae
Midges	Chironomidae
Milkweed Bugs	Lygaeidae
Millipedes	Diplopoda
Mites/Ticks	Acarina
Mosquitoes	Culicidae
Orb Weaver Spiders	Araneidae
Plant Bugs	Miridae
Robber Flies	Asilidae
Scales/Mealybugs	Coccoidea
Scarab Beetles	Scarabeidae
Scentless Plant Bugs	Rhopalidae
Skin Beetles	Dermestidae
Snails/Slugs	Gastropoda
Snout Beetles	**Curculionidae**
Spiders (in general)	Araneae
Stink Bugs	**Pentatomidae**
Termites	Termitidae
Treehoppers	Membracidae
Tumbling Flower Beetles	Mordellidae
Walkingsticks	Diapheromeridae

[1] The classification is provided to help distinguish each insect type and aid in proper identification.
[2] Insects in bold are those that are most commonly consumed by quail.

Appendix B. Sources and Additional Plant and Quail Information Resources.

Bartholomew, C.S., D. Prowell, and T. Griswold. 2006. An annotated checklist of bees (Hymenoptera: Apoidea) in longleaf pine savannas of southern Louisiana and Mississippi. *Journal of the Entomological Society* 79(2):184-198.

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